

NORWEGIAN UNIVERSITY OF LIFE SCIENCES



Brain Drain of China and India



YUAN LI

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Cover: Reverse Brain Drain Continues, More Senior Executives Relocating To India

<<http://trak.in/tags/business/2011/10/18/reverse-brain-drain-senior-executives-relocate-india/>

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Declaration

I, (Yuan Li), declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature.....

Date.....

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Abstract

Under the background of globalization, brain drain is a common phenomenon in many countries. Talents flow from developing countries to developed countries, and this phenomenon unavoidably exerts various and profound influences to both the source countries and the receiving countries.

This thesis deals with the phenomenon of brain drain with the aim to investigate the phenomenon further and carry out two case studies of China and India. The research method is mainly comparative case study. Information sources of this thesis are the open resources which could be accessed publicly.

The theoretical part discusses the definition and characteristics of brain drain and looks globally at the magnitude of this phenomenon. Motivations of brain drain are analyzed because a better understanding of motivations can facilitate formulation of proper policies on talent management. The costs of brain drain on the source country and the benefits to the host country are discussed in detail. The two case studies of China and India investigate the present situation and the impacts of brain drain in both countries, and the attitude and policies about brain drain by the Chinese and Indian governments. Reverse brain drain, as an inherent opposite of brain drain, is also discussed in this thesis as it has also been observed in both China and India. The motivations of talent return are various. Recently the global economic recession has great impact on the brain migration. The impacts on the overseas talents and on those who intend to migrate are discussed. Based on the information collected, the different policy measures in coping with brain drain in China and India are discussed.

The academic contribution of this thesis mainly lies in the comparative research of brain drain in the two largest developing countries- China and India, analysis of the motivations and impacts of brain drain, and the discussion on the implication of policy measures in coping with the phenomenon of brain drain.

Keywords: Brain drain, Talent, Migrate, China, India

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Abbreviations

AIIMS	All India Institute of Medical Sciences
RMB	Ren Min Bi(Chinese Yuan)
GDP	Gross Domestic Product
MOIA	Ministry of Overseas Indian Affairs
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development
UNESCO	United Nations Educational , Scientific , and Cultural Organization
UN	United Nations
UK	United Kingdom
US	United States
WHO	World Health Organization
TLB	Those Left Behind
IIE	Institute of International Education

1. Introduction

1.1 Background

The world is becoming increasingly borderless for skilled workers. Talented and skilled workers are migrating actively on the international labour markets, both permanently and temporarily (Manpower, 2008). On International Migrant Day in 2003, the UN general secretary Kofi Annan said “every day, in countries all over the world, people leave their home countries in search of a better life for themselves and their families. Emigration has a profound effect on the countries migrants leave, those through which they transit, and those to which they move” (Migrant.news, 2003).

Brain drain describes “an abnormal form of scientific exchange between countries, characterized by a one-way flow in favor of the most highly developed countries” (Iravani, 2011). It is a commonly observed phenomenon in many developing countries nowadays. Brain drain in developing countries is mainly caused by opportunities (both real and perceived) for better income, higher living standard, better education, better career development in destination countries; political instability, lack of job opportunities in home country; and personal pursuit of growth and happiness, employment opportunities, security and so on (Korner, 1998).

Whatever the reason may be, brain drain mostly has some negative effects to economic, social and technological development of any country. Human capital is an essential productive factor. When brain drain occurs, home countries lose their highly-skilled and knowledgeable human capital which was the outcome of long term investments in education, various research activities and other aspects. However, host countries may benefit from the skills of the immigrants without investing large amount of capital and resources. In the short term, source countries may profit by overseas remittance and new information sources, but in the long term, highly skilled and knowledgeable human capital outflow influences the development of

developing countries because talents are the most important motive power of development. Brain drain increases the technical and economic gaps between developing and developed countries. (Dong, 2008)

Despite the seriousness of the issue, brain drain remains under-studied at the academic level. There hasn't been a systematic comparative study of brain drain in China and India, and the implication of policy measures in dealing with brain drain in developing countries is seldom studied.

The reason why more attention should be paid on studying the causes and effects of brain drain is because the loss of talents has several impacts for the social and economic development of the sending countries. Oftentimes, developing countries are under pressure to retain high-quality human resources as many well-educated in developing countries prefer to migrate. People with lower educational levels generally have fewer opportunities to migrate to other countries, but those with higher educational level have better access to international migration. People with tertiary educational background are associated with the highest migration rate in almost all countries. The drained talents are more qualified than the average population of the sending country. Talent outflow will hurt economic, social and technological development of developing countries and talent outflow also will amplify the gap between developing countries and developed countries. Therefore talent outflow from developing countries is an issue which cannot be ignored (Carrington and Detragiache, 1998).

1.2 Aim and objectives

The aim of this thesis is to investigate the phenomenon of brain drain, exploring two case studies of China and India with a focus on governmental policies related to the transnational migration of talents. Through information collection and comparative analysis on status of brain drain and relevant policies in China and India, I intend to get a better understanding on the implication of policies on brain drain and to find out some proper policy measures for developing countries to cope with the phenomenon of brain drain. A better understanding of

brain drain may also ultimately promote sustainable manpower management and serve as basis of social and economic development.

My main questions include: What are the human, political, and economic causes and effects of brain drain in China and India? What are the motivations to migrate and return, and how do China and India attempt to attract and retain talent with policy measures? What are the similarities and differences of the brain drain situation (and reverse brain drain) between China and India, and can we draw comparative lessons? How has the global economic recession affected brain drain? In addition, I wish to discuss the potential policy implications of these findings, namely how could governments in developing countries deal with the problems of brain drain with political measures?

1.3 Methodology

The primary method of my study is a comparative case study. At beginning, I want to do an intensive research about brain drain issues of China because brain drain has been mentioned frequently in China in recent years. I thought a case study framework is good for me to study this problem intensively. But when I was discussing the idea with my supervisor Jason, he suggested me add another country and do a comparative study, because brain drain is not a single issue of China but a general issue in many countries. In different countries, brain drain has many common points and different points. Through the comparative case study, I can draw some comparative lessons. India and China are the top two largest developing countries in the world. They have similar natural conditions and very different social systems and cultures. Therefore it is very interesting to do a comparative study of these two countries. At last, I chose comparative case study to intensively study the China case and India case. When I chose the method of data collection, I considered about some quantitative and qualitative methods. Field survey would be a good method to collect first-hand information, but literature review is selected as the data collect method of this study because the scope of this research is too wide as it is attempted to provide a general investigation. Literature review coupled with a subsequent comparative analysis of the China and India cases is the suitable research method

within available time and resource limitations.

Detailed methods of this study include (Duignan, 2008):

- Search of scientific literatures: The selection of literature is focused on those which have synthesized other research evidences and those provide original research findings, for example, overview of brain drain, previous survey reports, and books which aim to provide comprehensive information related to the topic. The information sources are also only those with public accessibility.
- Analysis of documents and materials: This is to analyze other documents and materials such as organizational publications, legislations, media reports, databases and so on.
- Information evaluation: The information collected is evaluated on their reliability and timeliness.
- Data analysis: Data is collected from trustable publications, evaluated and analyzed.

1.4 Focus of study

- Talent

The concept of brain drain discussed in this report focuses on the well-educated and highly-skilled human capital and intellectual talents, such as scientists, engineers, physicians, entrepreneurs and professionals in other areas of expertise. University students and fresh graduates are potential high-quality human resource although they are still immature. Therefore students at tertiary education level are also within the scope of this study. However low skilled labor forces is not within the scope. This doesn't mean that the contribution of the labor forces with lower educational level could be neglected but because the migration of labour is usually tracked in a different way from the free migration of the skilled.

- Transnational migration

The talent outflow of interest in this study is that from developing to developed countries. Within the fierce global competition for talent, there is migration of talents between

developed countries as well, but the attempt here is to investigate how the brain drain of talents from developing to developed countries impacts the development of developing countries. Underdeveloped countries are generally in great demand of talents to help them get rid of impoverishment and to speed up social and economic development, but a portion of the well-educated talents in developing countries prefer to seek individual development in developed countries. Therefore I focus primarily on the transnational migration of talents.

Internal migration of talents in a specific country, for example from rural region to urban areas, is not the focus here. This kind of migration can also result in unbalanced regional development, but the study here aims to explore brain drain at a national level.

- Reverse brain drain

Reverse brain drain is the return of talents, usually constituting people of origin of a specific country who previously migrated to a wealthier country for working or education, and have since returned to their country of origin. Reverse brain drain discussed in this study should be differentiated from brain gain, which is a wider concept which refers to the gain of human capital wherever they are from.

- Geographical boundary

To narrow the scope of this study, China and India are selected as the study areas because these two countries have large talent outflows and are both in a develop process when human resources are extremely valuable. China and India have many similarities: wide regions, huge population, low living standards, etc; as well as many differences: political systems, religions, cultures, and so on. The differences make them have difference attitudes and measures when dealing with brain drain.

- Time horizon

Research on brain drain began from approximately the 1960s (Brass, 1969; Bodenhofer, 1967; Beijer, 1966; Grubel, 1966). However, as globalization processes over time, the situation and attitude of talent migration change as well. This study investigates the phenomenon of brain

drain retrospectively from forty years ago until today, with a focus on the post-2000 period in particular.

1.5 Structure of the thesis

Chapter two provides some fundamental information of brain drain, including the definition and characteristics of brain drain, the global overview, the motivations, and the costs and benefits of brain drain. Chapter three are some fundamental information on China and India related to brain drain. Chapter four and five analyze the brain drain of China and India in detail. Reverse brain drain as an inherent part of brain drain and a commonly observed phenomenon nowadays is discussed in Chapter six. Chapter seven looks into the impacts of global recession on brain drain. In the discussion in Chapter eight, the availability of brain drain data is discussed. The focal point in this part is the different policies regarding brain drain of Indian and Chinese governments. Some recommendations to the governments of developing countries are put forward. A brief conclusion of this paper is provided in Chapter nine.

2. Fundamental information of Brain Drain

2.1 Definition and characteristics of brain drain

The term Brain Drain was firstly coined by the British Royal Society to describe the phenomenon describing the exodus of British scientists and technologists leaving for North America during 1950s and early 1960. From then on there have been many different definitions of brain drain, with emphasis on different aspects of brain drain, e.g. the talent flow direction, the motivation, etc. (Giannoccolo, 2004). A 1968 UNESCO report defined brain drain as “an abnormal form of scientific exchange between countries, characterized by a one-way flow in favor of the most highly developed countries” (Iravani, 2011). According to the Cambridge Dictionary, Brain Drain describes the phenomenon when “large numbers of educated and very skilled people leave their own country to live and work in another one where pay and conditions are better” (Cambridge Dictionaries, 2012). The combination of “Brain” and “Drain” provides a very accurate interpretation of the phenomenon when the most talented and skilled people leave at a perceptible rate (Bushnell and Choy 2001, cited in Giannoccolo, 2004).

The following characteristics are usually associated with brain drain (Iravani, 2011,p 284-285):

- The flow direction of talents is usually from developing countries to developed countries.
- Engineers, scientists and medical workers are the dominant communities of brain drain.
- Talents with higher educational level tend to have higher tendency of migration.
- An important simulative factor is the lack of planning for the training of students in the education system of developing countries which results in improper utilization of their skills and knowledge at home countries.
- The phenomenon of brain drain is increasing rapidly in recent years and the migration of talents may be accelerated continually in the future. I discussed increasing trend of brain drain in section 4 and section 5.

Brain drain is problematic for developing countries in the political, economic, and social spheres. First, brain drain is a political problem even though the migration is rarely motivated by political reasons. To some extent the loss of the best talents is a symptomatic phenomenon which reflects disadvantages and drawbacks of policies in the source countries (Iravani, 2011). For example, failures in the planning of education can result in overproduction of talents in the same field and compel some of them to migrate in order to get a decent job; deficient income distribution systems can frustrate talents in the domestic labour market; ineffective environmental policies can drive talent outflows as individuals desire better living standards. Brain drain can also cause political problems as the talent outflow may accelerate the science and technology development in developed countries and slow down that of developing countries (Iravani, 2011).

Besides, brain drain is an economic problem. Usually the poorer the drained country is, the less profit it gains from the migration of talents to developed countries. When brain drain happens, the developing countries lose talents who are supposed to be the most important productive factor and the fraction of fiscal expenditures on training of the talents (Tehran times, 2001; Iravani, 2011). In turn, the developed countries acquire talents for growing their science and technology, economy, national defends as free, and companies base in developed countries acquire intellectual capital at low price. The economic development of developing and developed countries is increasingly unbalanced and the gaps between rich and poor countries will be expanded (Iravani, 2011). Agrawal et al (2010) also asserts that brain drain has net harmful effect to knowledge accesses of the country of origin. Losses of taxes is another economic impacts of brain drain to the developing countries (Abdelbaki, 2009)

Brain drain is also a social problem. Once the talents migrate to a new environment, they would have to face psychological pressure and cultural shocks. The talents leave home where their skills are quite valued and could have done more contributions, and migrate to developed countries where there is relatively abundant high quality manpower. Although they earn more in the host country, a psychological gap is unavoidable (Iravani, 2011). Those left behind can also be influenced by perceptible outflow of elites. They may feel insecure or

unease staying in home country as seeing the most talented departing. Brain drain can also reduce the efficiency of some key departments in the society as talents leave. As according to Wickramasekara (2002), brain drain reduces the efficiency of many essential services such as health care and education in the drained country. Besides, brain drain increase income disparities between the emigrated and those left behind (Wickramasekara, 2002).

The concern and interests on Brain Drain give rise to many relevant terms, such as “Brain Exchange”, “Brain Circulation”, “Brain Return” and “Brain Gain” (Wickramasekara, 2002; Giannoccolo, 2004; Iravani, 2011;). “Brain Exchange” focuses on the bidirectional talent flow between the sending country and the receiving country. “Brain Circulation” describes the cycle of studying abroad, working abroad, and returning home. This mode of talent migration is believed to increase in the future (Giannoccolo, 2004). “Brain return” means the return of talents from host country to their country of origin. It can also be termed as “Reverse Brain Drain”. “Brain Gain” implies that the net flow of talent is positive.

2.2 Global overview of brain drain

International migration of talents is common nowadays with enhanced levels of globalization and advanced communication and transportation technologies. Nowadays 215 million people, which accounts for 3% of the world population, are living outside their native countries. Half of the transnational migrants are from 20 countries, with China, Poland, India and Mexico ranked at the top of the list (MOIA, 2012). According to a survey by Lowell, et al (2004), nearly 10% of tertiary degree (undergraduate and graduate) holders born in developing countries are living in developed countries. Around 30% to 50% of the science and technology professionals from developing countries are working in developed countries (Lowell, et al, 2004). The demand of skilled human capital is always growing and the competition for talents is fierce among different countries. One example is that in 2002 the British government launched a research award to attract foreign talents and to induce

expatriate British scientists to return, and in the same year the US announced its annual cap of H1B visa would increase by 70% (Cervantes and Guellec, 2002).

The OECD countries are a popular destination of expatriate talents. It is estimated that one third of Research and Development (R&D) professionals from developing countries are living in the OECD countries. During 1990s, there were growing flows of talents from Asia to the US, Canada, Australia and the UK because of the strong demand for IT professionals and other specialists in science and technology (Cervantes and Guellec, 2002). The US is the country which has benefited mostly from brain drain in terms of sheer numbers of people since the Second World War (Giannoccolo, 2004). In 1990 immigrants accounted for 9.3% of the total labor force in the US, and in 2007, the number has risen to 15.7%. Moreover, a great part of these immigrants are well-educated (Wadhawa, et al, 2009). 40% of the US's foreign-born adults have tertiary level of educational attainment. By the year 2002, more than 900,000 well educated professionals, mostly IT specialists, mainly from India and China, have been attracted to the US by its H1B visa program. The US is also the most popular country for foreign students. 32% of the foreign students studying in OECD countries are in the US. A large proportion of these foreign students later worked in the US. For example, in 1999, 25% of H1B visa holders are people who previously studied in US universities (Cervantes and Guellec, 2002). Except for the US, Canada is also a popular destination traditionally. Germany implemented "green card" scheme to recruit foreign IT workers in 2000. Singapore also fills the gap of IT specialists with immigrants from Malaysia, China, and so on (Cervantes and Guellec, 2002). While there is talent migration between OECD countries but this kind of talent flow is mainly temporary and often appears as brain circulation other than brain drain (Cervantes and Guellec, 2002).

China and India are the two study area in this thesis, and the brain drain in China and India is discussed in more detail in Chapter 4 and 5.

2.3 Motivations of brain drain

The understanding of the motivations of brain drain is key to a better management of human resource and prerequisite for the policy-makers to cope with the negative effects of brain drain (such as hurt economic, social and technological development of developing countries, and amplify the gap between developing countries and developed countries). The followings are the incentives of brain drain in three categories: personal factors, socioeconomic factors of home countries, and incentive and opportunities in host countries.

Personal factors

Pursuit of higher education is one of the personal factors motivating initial talent migration (Dalmia, 2006). Many students from developing countries pursue higher education abroad because that the education capacity in their home countries is not adequate. However, a large part of the international students from developing countries never return after completion of their studies in developed countries. Personal satisfaction is another important reason for talents to stay abroad. A survey of elite emigration from Taiwan Province of China shows that most of the emigrated scholars are satisfied with their work conditions and recognition in their host countries, and more than 80% of them said they have a sense of achievement (Chang, 1992). Family considerations also affect brain drain. Cases of cross-country marriage increase and contribute to the migration of talents to some extent. Last but not least are the social and professional networks. For example, a survey of Indian doctors and nurses suggested that friends abroad were the most important motivation for them to emigrate; moreover, one fourth of Indian nurses have relatives living in foreign countries and it is a positive factor for them in the decision of emigration (Chappell and Glennie, 2010).

Socioeconomic factors of home countries

Socioeconomic conditions in home countries are also push factors for brain drain. First, social instability drives talents to leave. In 2004 a survey by the World Health Organization (WHO) of the health professionals in South Africa regarding their migration intention revealed that violence and crime in their country of origin are likely to motivate 38% of them to leave (Chappell and Glennie, 2010). Secondly, unemployment in home countries is a vital factor in

the decision of migration (Dalmia, 2006). Usually developing countries suffering from brain drain are also those with high unemployment rates. Thirdly, inferior working conditions and facilities are also important driving forces for talents to migrate (Dalmia, 2006). Those with high education levels are usually ambitious with regard to their professional career and they would like to work in an environment with better working conditions and facilities. Last but not least, brain drain can be caused by the inadequate planning and/or training of students. The over-production of talents in the same fields make the utilization of talents improper and let surplus of well-educated talents be left over. As one with adequate training has to face fierce competition to get a decent job in their home country, he may chose to migrate to another country. For example, in 1965 India had 75,000 engineers unemployed (Iravani, 2011). Till 2007, the number of unemployed engineers in India rose to 193,000 according to Lok Sabha (PTI, 2009). Every year India produces more statisticians and economics than it can absorb domestically (Iravani, 2011). Constant over-supply encourages talents to seek jobs in other countries constituting a waste of social resources of their home country.

Incentive and opportunities in host countries

Pull factors in host countries include relatively loose immigration rules, better research facilities and environment, better career opportunities, and higher salary. The immigration rules of developed countries place crucial importance on this in migration decisions (Dalmia, 2006). One example is the H1-B visa of the US. The amendments of the US Immigration and Nationality Act in 1990 introduced the H1-B visa category which was dedicated for non-immigrant highly skilled talents to work temporarily in the US. This policy attracted many foreign talents to work in the US every year (Khadria, 2006). Besides, developed countries generally have better research facilities and environments that can be strong consideration for the elite immigrants to stay (Chang, 1992). This incentive is especially important to scholars and researchers (Chang, 1992), because scholars and researchers have higher requirements of research facilities and environments than other immigrants. Moreover, better career opportunities are also strong “pull” factors to retain the foreign talents (Chang, 1992). Compared to those who are already qualified, students tend to give more priority to employment (Chappell and Glennie, 2010). Above all, higher salaries in host counties play a

crucial role in attracting foreign talents. Chang (1992) stated that the salary of doctor and master's degree holders are three to six times higher in the US than in the Taiwan Province, China. It is considered as one critical "pull" of brain drain from Taiwan to the US. Money motivation is important for both university students and skilled professionals in the decision to migrate (Chappell and Glennie, 2010)

Considering the massive motivation factors influencing brain drain, and the different values that various people hold, it is generally difficult to rank the relative importance of all the factors. One trial is a survey of 1,203 Chinese and Indian returnees from the US in 2008 by Wadhawa et al. (2009) in which the factors contributing to the decision to migrate was weighted, as shown in figure 1. The research results highlighted the importance of educational development and professional development in the decision of migration. 44.7% Indian and 39.9% Chinese respondents think educational development is extremely important in their decision to migrate to the US, and 48.0% Indian and 36.7% Chinese respondents consider professional development is extremely important factor (Wadhawa et al, 2009). Other important factors contributing to the decision of migration to the US include better facilities and infrastructures in the US, quality of life, and better compensation levels (Wadhawa et al, 2009). The survey also found the unemployment in home country is the least important factor, with 39.2% Indian and 47.9% Chinese respondents said lack of jobs in home country is not at all important (Wadhawa et al, 2009).

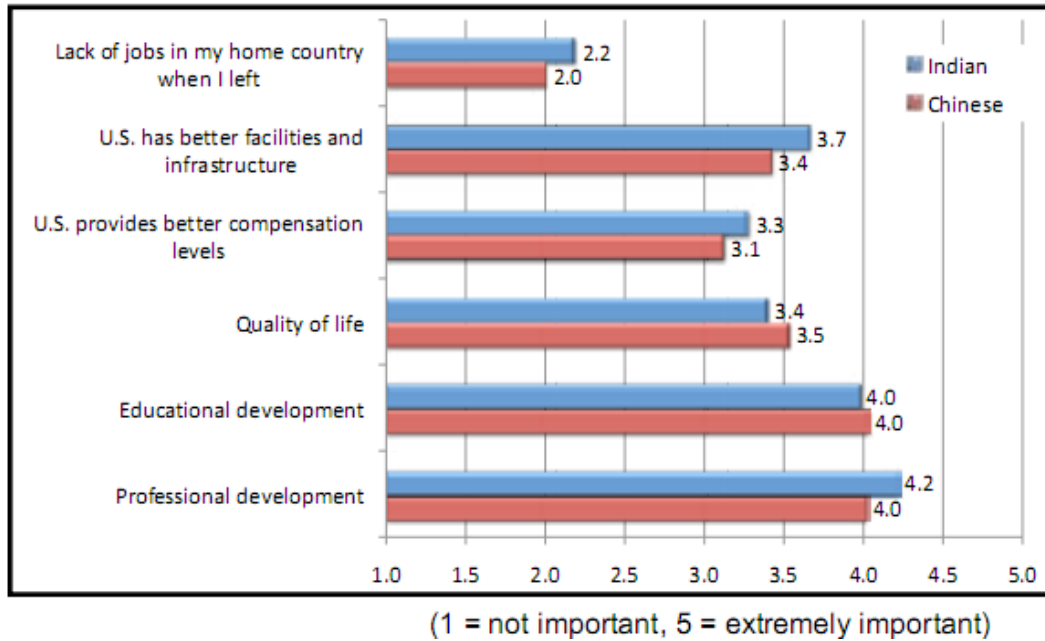


Figure 1 Average rating of factors contributing to decision to migrate to the U.S (Wadhawa, et al, 2009)

2.4 Effects of brain drain to sending countries and host countries

The early literatures on brain drain in 1960s (Brass, 1969; Bodenhofer, 1967; Beijer, 1966; and Grubel, 1966) all came to the conclusion that the emigration of well-educated talents to developed countries would abate the welfare of those left behind (TLB) in developing countries. This is true while the social expenditure on education is larger than the gain from the educated talents since education is usually partly publicly financed. Brain drain was regarded as harmful for the sending country for a long time (Beine, et al, 2003). Hamada (1977) argues that brain drain benefit the developed country on the cost of welfare of TLB in developing countries. Todaro (1996) also asserts that brain drain results in loss of high quality manpower and slows down economic development in source developing countries. However, some theoretical arguments on the benefits and costs of brain drain look on the positive aspects to the sending countries. For example, one of those “beneficiary brain drain” arguments is that the migration of talents from developing countries helps promote the overall education level of the source country. Nowadays, many immigration policies in developed countries are a quality-selective one. If people want to increase the opportunity to migrate to

developed countries, they have to get educated. And since the real fraction of people really emigrated from the source country is small, the overall manpower of the source country is increased as a result. Other arguments in favor of brain drain include foreign remittances received from the overseas talents, professional and trade networks established due to migration, and reverse brain drain through which the returnees come back with advanced knowledge and technology from developed countries (Beine, et al, 2003). According to an empirical study by Beine, et al (2003), the effect of brain drain on source countries can either be positive or negative. Through model analysis, they conclude that most countries are losers of brain drain, and these part of countries are those with more than 20% migration rate of the higher educated population or with higher than 5% of the total population are highly educated.

The sending countries, especially developing countries, are usually regarded as losers in brain drain. Migrants from developing countries are more likely to stay in the developed countries where they studied or worked than migrants from other developed countries. A survey of the doctor degree recipients in the US during 1990-91 shows 79% of Indian PhD graduates and 88% of Chinese PhD graduates were still working in the US until 1995, while the percentage of their counterparts from Korea and Japan were only 11% and 15% (Cervantes and Guellec, 2002). Except for the loss of human resources, brain drain is also regarded an economic loss because the part of value for training which is sponsored by the government of sending country is taken away with the emigration of talents. For example, around 525,000 to 800,000 talents became permanent US citizens in the past 30 years. Two third of them are college graduates who received tertiary education at their home country where the government subsidies are often as high as 90% (Iravani, 2011).

Host countries of the migrating talents benefit a lot. The immigrants meet the domestic demand of human resources. For example, The US has 5% of the world population and 11% of the world's physicians. Obviously the gap is filled by foreign talents and most of these foreign talents live in the US permanently (Dalmia, 2006). The foreign talents contribute to the development of the receiving country, especially to science and technology, innovation

and entrepreneurship (Cervantes and Guellec, 2002). For example, in 2009, four of the seven US Nobel prize winners are immigrants from other countries (Chinaview, 2009). The receiving countries' government also saves money on education and individuals opportunity cost of the study because a large part of the gained brains are educated at tertiary level at their own native countries (Iravani, 2011).

3. Fundamental information of China and India

This part aims to study the relevant socioeconomic information of China and India, as well as other information related to the brain drain of the two countries. This is essential part for the comparative analysis in this thesis.

3.1 Socioeconomic similarities between China and India

China and India are two top powers of current global developing countries. These two countries have seen increased attention in recent years because of their growth of international influence. China and India have many common points: a vast territory, huge population, and rapid economic development. This part provides some socioeconomic background related to brain drain in both China and India.

Table 1 summarizes some general socioeconomic data of China and India which serves as a base for talent migration in the two countries.

Table 1. Some socioeconomic data of China and India (Data sourced from CIA, 2012)

Item	China	India
Population	1,343,239,923 (2011) Rank in the world :1	1,205,073,612 (2011) Rank in the world :2
Net migration rate	-0.33 (2011) Rank in the world: 133	-0.05 (2011) Rank in the world: 116
Literacy	92.2%	61%
GDP - real growth rate	9.2% (2011) Rank in the world :7	7.8% (2011) Rank in the world :15
GDP - per capita	\$8,400 (2011) Rank in the world :120	\$3,700 (2011) Rank in the world :163
Population below	13.4% (2011)	25% (2007)

poverty line		
Unemployment rate	6.5% (2011) Rank in the world :70	9.8% (2011) Rank in the world :109

China and India are the two most populous countries in the world. The huge populations may be a motivating factor of brain drain because the domestic competition for jobs, educations, communal facilities and other resources are more serious in internal societies.

Net migration rate is a measure of the difference between immigration and emigration of a country in a specific year. The higher the value is the more people are immigrating to the country. The lower the value is the more people are leaving the country. The net migration rate of China is -0.33 migrants/1,000 population in 2011, ranked in the 133 within 220 countries in the world (CIA, 2012). The net migration rate of Indian is -0.05 migrants/1,000 population in 2011, ranked in the 116 in the world (CIA, 2012).

In addition, the literacy in China is 92.2%, and that of India is 61%. This may indicate the education system of India faces more challenges than China. Also, the unemployment rate in China is 6.5%, ranked 70 in the world, while the unemployment rate in India is 9.8%, ranked 109. Therefore, compared to China, Indian talents may have more pressure on employment and may have to go abroad to find a decent job.

The real growth rate of GDP in China and India are both high, 9.2% and 7.8% respectively in 2011. However, due to the large demographic basis, the per capital GDP are both low, ranked 120 and 163 respectively in the world. Population below poverty line in China is 13.4% while in India is 25%. The development of economy and society in the two countries requires high quality manpower, but the low per capital GDP is a contributing factor to brain drain as talents tend to pursue higher payment and quality of life in developed countries.

Both China and India need to face negative effects of brain drain and find out solutions.

Governments of India and China have different attitudes about the problem of brain drain and published some different policies to solve this problem. I analyze this question in sections below.

3.2 Popular fields of study for Chinese and India international students

Table 2 shows the field of study of Chinese and Indian students in the US in 2010 to 2011. From the table, it is obvious that Chinese and Indian students who study abroad prefer some similar fields such as Business/Management, Engineering, Math/Computer science and Physical/Life sciences. The most popular fields of study for students from both China and India are all the specialties with high demands in developed countries.

Table 2. Field of study for the Chinese and Indian students in the US in the year of 2010/2011 (Date referred from Open Doors Data, no date)

	Business/ Management	Education	Engineering	Fine/ Applied Arts
China	27.5	2.1	19.2	3.4
India	15.2	1	36.9	1.3
	Health Professions	Humanities	Intensive English	Math/ Computer Science
China	2	1.2	4.3	10.6
India	4.9	0.6	0.7	19.8
	Physical/ Life Sciences	Social Sciences	Undeclared and other	
China	11.5	7	11.2	
India	11.4	3	5.2	

3.3 Talent shortage in domestic labor market

Manpower Group conducts Talent Shortage Survey every year, and in 2012 the survey was conducted by interviews with more than 38,000 employers in 41 countries and regions. For the Asia Pacific region, the sample volume was 8,786 employers. This survey revealed the difficulties in filling positions in different countries and the jobs which are most difficult to find appropriate talents. Figure 2 and 3 shows the percentages of having and not-having difficulty in filling jobs reported by the interviewed employers in China and India. Comparing the two figures, in the years of 2006, 2007, 2008 and 2010, more Chinese employers reported difficulty in filling jobs than Indian employers. But recently, in years of 2009, 2011, and 2012, India has much higher rate of having difficulty filling jobs. The most recent survey founds 23% of employers reported having difficulty filling jobs in China, and 48% in India. Besides, more volatility of percentage of employers reporting difficulty was observed in India. Figure 4 and 5 shows the top ten most difficult-to-fill jobs in China and India in 2012. Most Chinese employers reported Technician as the most difficult-to-fill position, while most Indian employers had difficulty in seeking qualified IT professionals (Manpower, 2012). According to the survey, Indian has more serious problem of talent shortage than China in recent years, and the most difficult-to-fill position in India is IT professional which is the group of most migrating talents in India as well. Therefore, this may indicate that India gets more impacts on domestic labour market from brain drain compared to China.

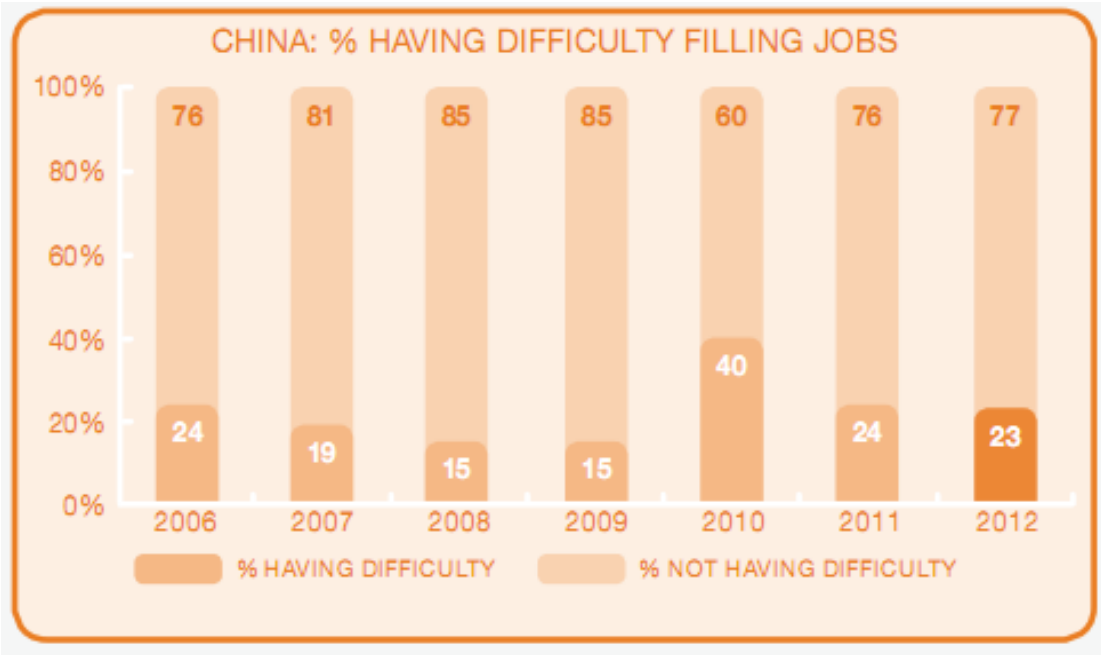


Figure 2. Difficulty in filling jobs in China (Manpower, 2012)

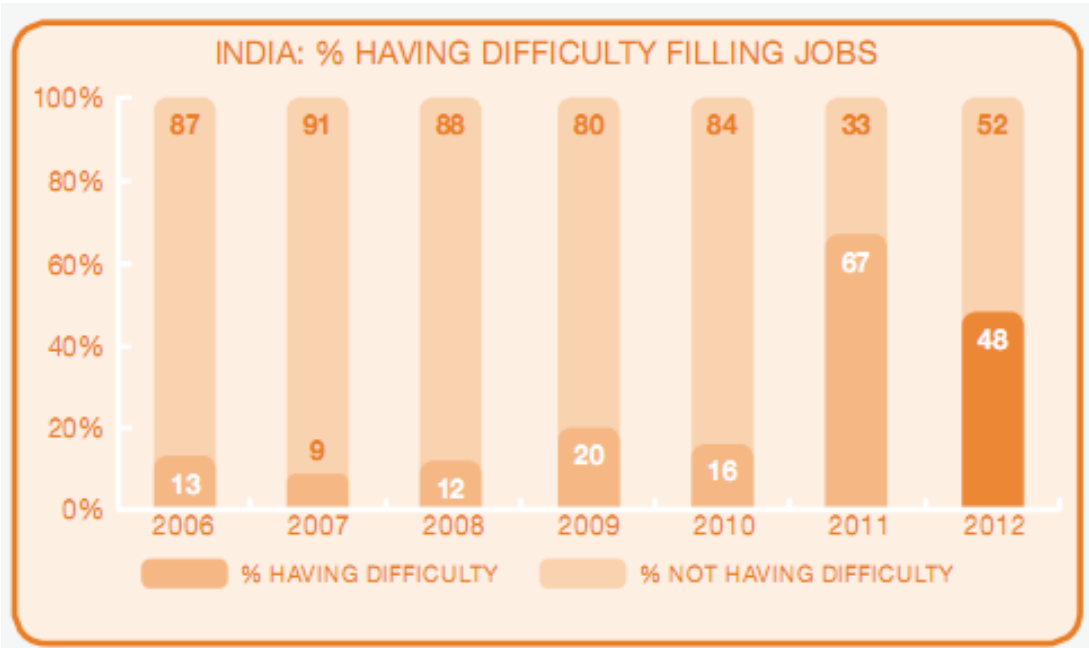


Figure 3. Difficulty in filling jobs in India (Manpower, 2012)



Figure 4. The most difficult-to-fill jobs in China (Manpower, 2012)



Figure 5. The most difficult-to-fill jobs in India (Manpower, 2012)

4. Brain drain in China

4.1 Present situation of Brain drain in China

Brain drain in China has been enhanced since the reform and opening up from 1978. The main channel of brain drain in China is students and scientific researchers going abroad to study and never coming back (Cao, 2004). According to the annual statistics report of students studying abroad in 2011 which was published by the Ministry of Education of China on February 10, 2012, from 1978 to the end of 2011, the number of all kinds of personnel studying abroad is 2.2451 million, and the number of personnel come back from abroad is 818.4 thousands (Chinese Ministry of Education, 2011). About 65% of Chinese who studied abroad have chosen not to go back to China. The Chinese Academy of Social Sciences submitted a report in 2009 which concluded that China has maximum number of talents flow to other countries in the world .(Cao, 2008)

Almost all the students who study abroad come from the best universities, e.g. Tsinghua University and Beijing University, the two most famous universities in China. Since 1985, 80% of Tsinghua university graduates and 76% of Beijing university graduates involving high-tech went to the United States. (Cao, 2008) This phenomenon is also seen in other universities in China.

According to incomplete statistics, most overseas Chinese students flow to the United States, and most students who want to stay in developed countries after graduation also choose the United States (Pang, 2004). Between 1988 to 1996, about 85% (14000) of Chinese science and engineering doctoral graduates stayed in the United States, and 48% of Chinese doctoral graduates found a job in the United States before they graduated (Pang, 2004). According the open door report of Institute of International Education (IIE), China has become the biggest origin country of international students in US in 2010, See table3. The number of Chinese-born students accounts for 21.8% of the total number of international students in US in 2010.

Table 3. Top 25 Places of Origin of International Students, 2009/10-2010/11(Institute of International Education, 2011).

TOP 25 PLACES OF ORIGIN OF INTERNATIONAL STUDENTS, 2009/10 - 2010/11					
Rank	Place of Origin	2009/10	2010/11	2010/11 % of Total	% Change
	WORLD TOTAL	690,923	723,277	100.0	4.7
1	China	127,822	157,558	21.8	23.3
2	India	104,897	103,895	14.4	-1.0
3	South Korea	72,153	73,351	10.1	1.7
4	Canada	28,145	27,546	3.8	-2.1
5	Taiwan	26,685	24,818	3.4	-7.0
6	Saudi Arabia	15,810	22,704	3.1	43.6
7	Japan	24,842	21,290	2.9	-14.3
8	Vietnam	13,112	14,888	2.1	13.5
9	Mexico	13,256	13,713	1.9	2.0
10	Turkey	12,397	12,184	1.7	-1.7
11	Nepal	11,233	10,301	1.4	-8.3
12	Germany	9,548	9,458	1.3	-0.9
13	United Kingdom	8,861	8,947	1.2	1.0
14	Brazil	8,786	8,777	1.2	-0.1
15	Thailand	8,531	8,236	1.1	-3.5
16	Hong Kong	8,034	8,136	1.1	1.3
17	France	7,716	8,098	1.1	5.0
18	Nigeria	6,568	7,148	1.0	8.8
19	Indonesia	6,943	6,942	1.0	0.0
20	Malaysia	6,190	6,735	0.9	8.8

21	Colombia	6,920	6,456	0.9	-6.7
22	Iran	4,731	5,626	0.8	18.9
23	Venezuela	4,958	5,491	0.8	10.8
24	Pakistan	5,222	5,045	0.7	-3.4
25	Russia	4,827	4,692	0.6	-2.8

Figure 6 shows that the number of Chinese students staying in US for years from 2006 to 2011. Obviously, increasingly more Chinese students choose to study in US in recent years.

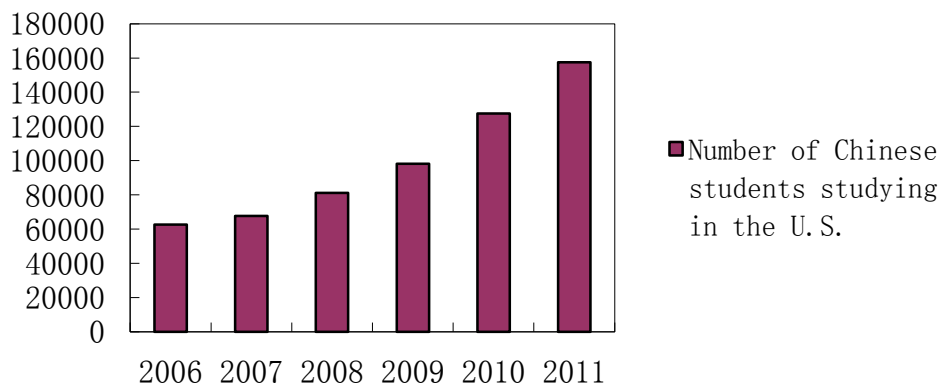


Figure 6. Number of Chinese students studying in the U.S (source from Institute of International Education)

The Xinhua news agency reported that “65,000 Chinese immigrate or obtain permanent resident status in the United States last year; the number in Canada is 25,000 and in Australia is 15,000”(Willy, 2010). Most of the emigrants are professionals and experts who have a middle-class background (Ajay, Devesh, McHale 2006). These people are the backbone for the development of China.

In recent years, large numbers of medium-skilled workers, such as mechanic and businessman, have left China for developed countries. Most of these people immigrate to major western countries through investment-related methods. (Pang, 2004) China tends to become the largest

investment-related emigration country in the next few years (Willy, 2010). The reasons are that a part of Chinese people have enough money to live in major western countries and migrate to major western countries is very popular among rich Chinese.

Although the economy of western countries has gone downhill because of financial crisis in recent years, more and more Chinese students are expected to go to developed countries to study. There are 270,000 Chinese going to foreign universities as self-paying students in 2006, but only less than 25% of them plan to return to China after graduation (Ajay, Devesh and McHale 2006). We can see the trend of brain drain in China from the following two figures. Figure 7 shows the number of Chinese students going abroad and returned. As depicted in the figure, there is an explosive growth of Chinese international students from 1978 to 2006, but the number of returned students increase in a much more moderate rate. Figure 8 illustrates the return rate of international students to China. The highest return rate appears in the year of 1984, which is 54%. After that the return rate has fallen sharply, to 23% in 2004. And then there is a moderate increase in recent years. Detailed data can be seen in table 7 in Appendix.

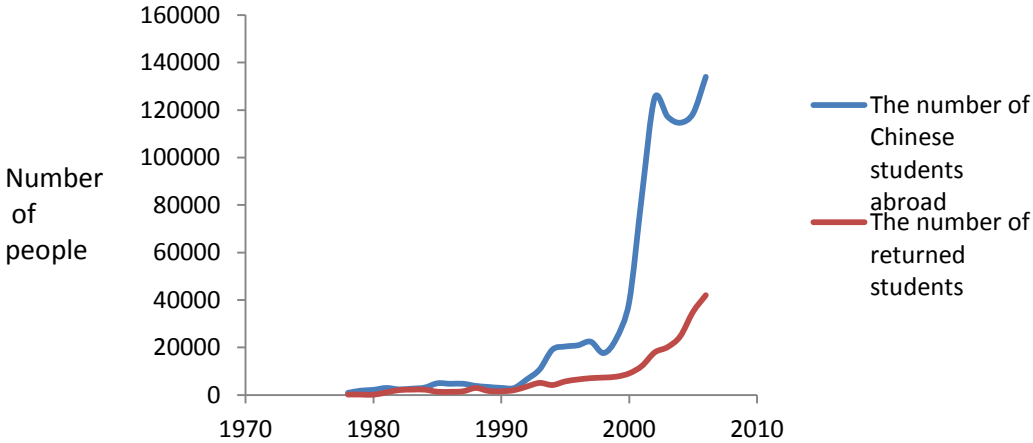


Figure 7. The number of Chinese students going abroad and returned (Data from Cao, 2011)

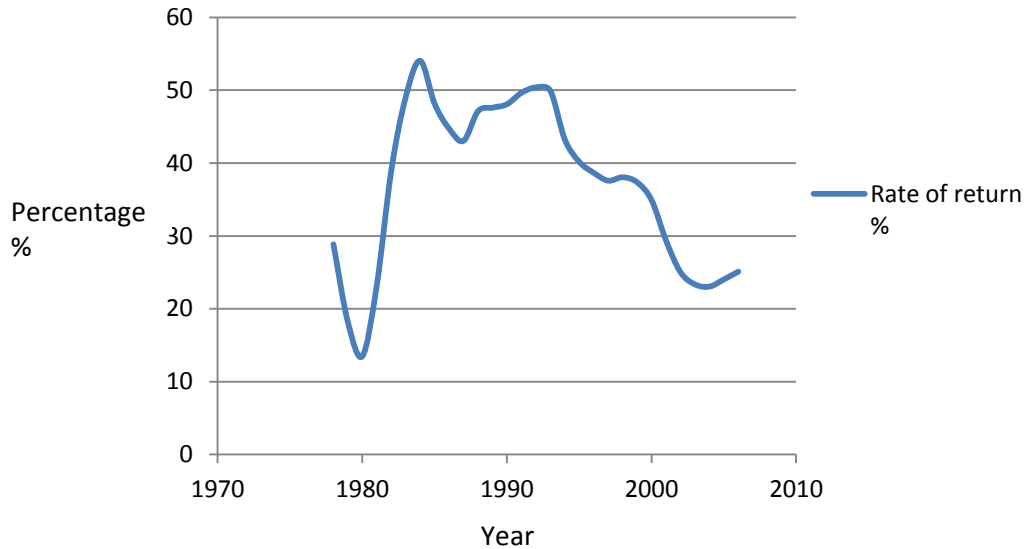


Figure 8. The rate of return of Chinese students (Data from Cao, 2011)

4.2 Reasons of brain drain in China

There are many reasons for shrinking of return rate of Chinese international students.

Firstly, the Chinese government has unduly strong power. In China, the government has unduly power to do many things which was not allowed by people. Therefore normal citizens' rights are very easy to be hurt. And it is easy for government officers to get benefit for themselves by using the power of government. People feel unsafe and unfair as a result of government's unduly strong power. It makes many overseas talents do not want to return. (Cao, 2008)

Secondly, the environment deteriorates. Despite of the great growth of Chinese economy, the environment deteriorates seriously because of development out of order and lack of management. In many big cities of China, the air quality has become a serious problem and many sources of water get contaminated. For the consideration of health and quality of life, some overseas talents do not want to return. (China news, 2012)

Thirdly, social security system fails. Chinese social security system is a defective and unbalance system. Many people, especially people in rural areas, only have a little part of social welfare, but people in urban areas, especially civil servants, have much more social

welfare. The failure of Chinese social security system has augmented the instability of the society and makes people feel insecure. Overseas talents feel it's more secure to stay abroad under a relatively more successful social security system in developed countries, so they do want to return. (Cao, 2011)

Fourthly, education system fails. Many Chinese people think Chinese education system is cruel and it strangles people's creativity. Many overseas talents are worried about if they come back their children would have to accept the cruel and defective education system, so they do not return. (Pang, 2004)

Fifthly, food security deteriorates. In recent years, more and more food security problems have happen as a result of lack of government regulation. Through news media reports, these problems cause a national panic. Many people think China is not safe to resident now. Many overseas talents believe food security management is much better in developed countries, so they are willing to stay in developed countries. (Pang, 2004)

4.3 Impacts of brain drain in China

The impact of brain drain to China is huge and long lasting. In this part, three categories of impacts are discussed in detail.

4.3.1 Impacts on development of economy and technology

China is a big power of human resource, but the national overall quality is not high. According to the data of the sixth population census, China has a population of 1,370,536,875, but only 4.7% population have college degrees or above and 18% population have high school diplomas or above (Nation Bureau of Statistics of China, 2011). In 1998 the Organization for Economic Co-operation and Development (OECD) announced that on a world average, 16% population have collage degree or above and 80% population have high school diploma or above (Pang, 2004). International comparison research shows that in developed countries where modern science and technology are the leading economy, high school education level is the starting point of working population generally; at least 25%

population have higher education degrees, the proportion of bachelor or above is never less than 15%.(Pang, 2004) The per capita education year of China is 8, but in developed countries and some emerging industrial countries, the per capita education year is over 11(Pang, 2004). Obviously, China's national education level can not meet the development of modern society. There is a low national overall quality because of the serious deficiency of China's talent.

Talents are the power for the development of the modern economy. China's talents are very precious. They are the back-bone of the development of China. When many talents go abroad, many aspects of China's development will be influenced. It will slow down the development of Chinese economy and technology

4.3.2 Loss of fiscal expenditure

Talents cultivation requires a lot of investment. The higher education system of China is a system of much government subsidy. With the governmental aids, individuals are free to go to school or just have to pay a small part of the education fees. Although in recent years the higher education system is gradually reforming to a charge system, the fees of people have to pay is still not enough to balance with the state's education spending. According to the education experts' estimation, the Chinese government needs to invest 200,000 RMB for every college student. Without considering family investment, the effort that parents pay and the individuals' opportunity cost of the study, China has permanently lost at least 300,000 scientific and technical personnel, equivalent to 60 billion RMB of human capital flowed abroad (Dong 2008).

Students going abroad at one's own expenses must pay expensive tuition fees and living expenses. The number of self-sponsored Chinese international students is around 310,000 (Dong 2008). Assuming the tuition fees are 30000 dollars per capita, there are 9.1 billion dollars capital flowing abroad. (This does not count the expenses of students going abroad before 2011.) If calculate opportunity cost and future contribution, the loss due to scientific

and technical personnel outflow is even bigger. Although some universities and governments of the developed countries have projects to subsidize students, the subsidy allocated to international students is low. According the open door report of IIE(Institute of International Education), most U.S international students' source funding are Personal funds, Family Funds and Home Government/University (69.2%).Only 0.6% international students' source funding is U.S government and 23.9% international students' source funding are U.S. College or University.(IIE,2011). A report from U.S. Department of education demonstrated the rate of Asian race student gaining a scholarship is much lower than students of white race and black race (U.S Department of education, 2008). Most Chinese overseas students have to pay expensive tuition fees and living expenses. As a result, despite some international students go back to home countries after graduation, there is only a tiny fraction of education investment flow to China from developed countries.

4.3.3 Implicit invasion to education and research

Many scientists, technicians, social science workers, and teachers crave good scientific conditions and scientific research funds in developed countries. The leaving of these talents has a serious impact to Chinese education and research. At first, they interrupt their researches and works, migrate to developed countries. It causes many important researches and projects could not go on. Secondly, these migrants bring many research results going abroad, and developed countries could get these results with a cheaper price. When these migrants have some important research findings or breakthroughs, the ownership of these research results belongs to developed countries. China must pay expensive technology transfer fees when introducing these technologies. Thirdly, brain drain cause scientific research values and standards to be more dependent on developed countries (Commander, Kangasniemi.2002).

4.4 The attitude and policies about brain drain of Chinese government

4.4.1 Attitude and policies before 1992

Before 1992, Chinese government had changeful attitude and policies on brain drain.

Chinese government was aware of the importance of talents very early. During 1950s to 1960s, Chinese government dispatched thousands of excellent students going to the Soviet Union and eastern Europe to study advanced technology and most of this students returned to China.

After the Cultural Revolution, Chinese government realized that China was lack of talents to construct a modern country, so the Chinese government decided to dispatch some excellent students to go abroad, aiming to make it as an important way to improve China's science and education level. Between 1978 to 1988, there are more than 60,000 students and scholars went abroad. Most of these students and scholars returned (Chang and Deng, 1992).

After 1989, because of crackdown on the pro-democracy demonstration (Tiananmen incident), some overseas students and scholars lost confidence on the Chinese government. They thought the political environment in China worsened and they could hardly adapt to it (Chang Parris and Deng Zhiduan, 1992). At that time, a big part of oversea students and scholars were even afraid if they go back to China, they would be considered as the objects of class struggle. (ZWEIG, 2006) At the same time, many western countries' government announced to cancel limits on Chinese students' VISA and allowed them to live after their visas expired. Some countries even decided to give Chinese students permanent residence permits. (Chang Parris and Deng Zhiduan, 1992). More than 50,000 students and scholars retained in developed countries and never go back to China. It caused the first brain drain of China (Cao, 2008). The Chinese government implemented a policy to restrict Chinese going abroad for study. The most important way to restrict students and scholars going abroad was to set a "service period" for undergraduates and graduates. Undergraduate must serve for the country for at least 5 years and graduate must serve for at least 7 years before they leave if they wanted to go abroad for study. This policy has greatly reduced the number of student going

abroad but also reduced the number of returnees. (Chang and Deng, 1992).

4.4.2 Attitude and policies after 1992

Many government-sponsored students not coming back makes Chinese centre government pay more attention on the phenomenon of brain drain. In February of 1992, Deng Xiaoping, the highest leader of China at that time, made his last public speech to support reform and opening-up. In this speech, Deng appealed overseas Chinese student and scholars to come back and help China, “We hope that all people who have gone overseas to study will come back. No matter what their previous political attitudes were, they can all come back; and after they return, working will be well arranged. This policy cannot be changed”. (Deng, 1993) In this speech, Deng wanted to change the overseas Chinese’s bad impression on the communist government and change the trend of brain drain (ZWEIG,2006). Deng also believed that China should continuously sent students abroad to study (Cao, 2008).

After Deng’s last speech, Chinese government put more emphasis on the issue of brain drain. Chinese government announced many policies and projects to support students and scholars go abroad to study and attract them come back, mainly in the administrative support and financial support realms which are discussed below.

Administrative support

- 12 character policy

In August of 1992, the Chinese Ministry of Personnel and State Education Commission of China followed Deng’s direction and implemented some policies to support Chinese students go abroad to study and attract overseas talents to return. The Ministry of Personnel announced a series of policy to serve the returnees. And State Education Commission of China also announced the famous 12 character policy –“supporting overseas studies, encouraging return and allowing students come and go as they will” to support Chinese students and scholars go to abroad to study and come back. (ZWEIG, 2006)

- Establish Service Center for Scholarly Exchange

Chinese Ministry of Education has established more than 100 Service Center for Scholarly Exchange in every province of China. The responsibility of Service Center for Scholarly Exchange is to provide service for returnees and individuals who want to go abroad. Service Center for Scholarly Exchange is helping returnees solve many problems such as finding jobs, applying for accommodation, getting housing subsidies, applying for research funds, arranging their children to school and so on. These Service Centers for Scholarly Exchange have greatly facilitated and helped returnees' in both working and daily life. (Chinese Service Center for Scholarly Exchange, 2012)

- Establish organization of overseas scholars

Chinese embassies and consulates set educational bureaus to help overseas Chinese students and scholars. Educational bureaus of Chinese embassies and consulates have helped Chinese students and scholars to establish organization of overseas scholars in most of gathered city of Chinese students and subsidize these organizations' activities (ZWEIG, 2006). Educational bureaus have stimulated overseas personal's patriotism and encourage them to serve for the motherland

Financial support

- Research initial funding for returnees

Research initial funding for returnees was set by the Chinese Ministry of Education. This fund focuses on helping returning students solve the problems associated with scientific research startup. Till 2011, 20,506 returnees were subsidized to start their scientific research. Total fund was more than 1 billion RMB. According a questionnaire survey of returnees who were supported by research initial funding for returnee, within the 1975 valid questionnaires, 80% of returnees who were supported believe research initial funding has big influence for starting of their research when their just returned to china. Research initial funding for returnees do not only help returnees to start their research, but also encourage overseas students return to China for work. (China news, 2012)

- 100-Talent Programme

100-Talent programme was launched by the Chinese Academy of Sciences in 1994. This programme planned to attract and train a hundred outstanding young academic leaders from abroad. In the 100-Talent programme, excellent talents receive 2 million RMB fund support each, including research fund, instrument equipment fees and subsidized housing fees. From 1997, 100-Talent programme began to expand its recruitment scale. The recruitment scale extended from 20 people every year to 100 people annually. Till the end of 2005, 1443 excellent young scientists were supported by the 100-Talent programme. These young scientists have gotten great amount of scientific achievements and have markedly improved China's international influence in science and technology. (Chinese academy of sciences, 2012)

- “Spring sunshine” plan

“Spring sunshine” plan, whose full name is “Special funds of the ministry of education funding students studying abroad short-term come back to work” .In 1996, Chinese Ministry of Education began to implement this project. This project planned to attract students and scholars who were remaining overseas to come back to China for short visits or a short-term work. This project has stimulated overseas talents’ interest in coming back to see the current situation of China and do some academic exchange. Till the end of 1998, the “Spring sunshine” plan had funded 1100 oversea talents coming back to visit and do a short-term job. Till the end of 2007, there were more than 10,000 scientific research personnel being funded. (Ministry of education of the people’s republic of China, 2012)

- Chang Jiang Scholar Programme

In order to attract overseas talents to return, the famous Hong Kong enterpriser Li Kai-shing’s Chang Jiang Holdings and Chinese Ministry of Education jointly launched the Chang Jiang Scholar Programme from 1998 (Cao, 2008). Chinese Ministry of Education had planned to set 300-500 Distinguished Professor position(Chang Jiang Scholar) in China’s major universities and invite applicants of outstanding young and middle scientists(especially academic leader from overseas). Every Distinguished Professor could get 100,000 RMB subsistence allowance every year apart from their salary. After 2010, the subsistence

allowance is raised to 300,000RMB every year. Scholars who have major academic achievements or made outstanding contributions in tenure can be awarded the annual “Chang Jiang scholars achievement award”. The “Chang Jiang scholars achievement award” elect 1 first prize and 3 second prizes, given 1,000,000 RMB and 500,000RMB award respectively. Chang Jiang Scholar Programme effectively attracted a great number of overseas outstanding scholars to come home for a job and serve the country. Till the end of 2006, 1107 scholars were hired as Distinguished Professor. 94% of Chang Jiang Scholar Distinguished Professors were returnees from abroad. (Chang Jiang Scholar Programmed,2012)

Undoubtedly, the efforts of attracting overseas talents have some good results. These programmes which attract overseas talents to return have eliminated many barriers of overseas talents in returning. But there are some basic reasons which hinder overseas talents are not solved yet. Firstly, Chinese society is a society of relationship. Whether a project is supported by government depends on your relationship with government officers or other people who have powers. Returnees from overseas are away from China for a long time, so their social network is weak and it is very difficult for them to rebuild the network. Many overseas talents do not want to come back because they are afraid to adapt to this kinds of social culture. Secondly, Chinese overseas talents who want to return are also been nagged by the political uncertainties in China. In china, to some extent, occupational promotion also depends on your political attitude rather than academic achievements. Thirdly, the problem of corruption is a barrier for overseas talents coming back. Many overseas talents are worried that their normal work and research will be disturbed by corruption. Last but not the least, economy is also a critical factor of the low return rate. Although the government has many projects to provide economic support to returnees, only a small part of high end talents could get these supports. So many overseas medium talents did not return because of the low income. But in recent years, this problem has been gradually solved due to the growths of economy and improvement of living standard in China.(Wang Haiyang, 2007)

5. Brain drain in India

5.1 Overseas Indians

By the year of 2012, the community of overseas Indians has reached 25 millions. Overseas Indians are comprised of Non-Resident Indians (NRI) and People of Indian Origin (PIO). An NRI is an Indian citizen who doesn't reside in India and a PIO is a person of Indian origin but not Indian citizen (MOIA, 2012). Figure 9 depicts the trend of emigration for employment of Indians in the past six years. Although there are fluctuations over years, obviously a significant number of Indians are leaving home and get employed in other countries every year. Figure 10 illustrates the global distribution of overseas Indians. As shown in the figure, most Indian Diasporas live in Southeast Asia, Gulf, and the US. What's worth mentioning is that figure 9 and 10 take into account all the overseas Indians, both the high-skilled knowledge workers and low-skilled labour forces.

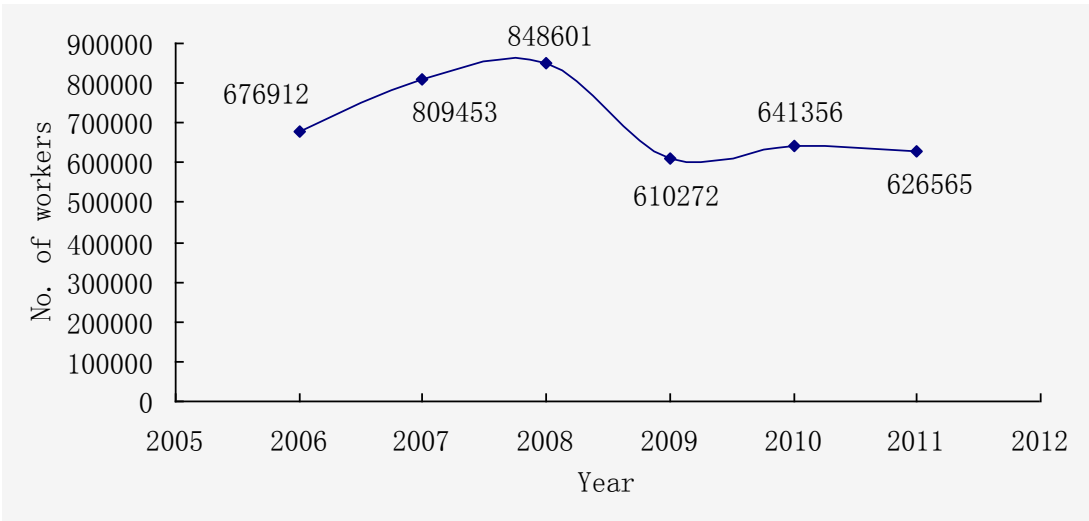


Figure 9. Emigration for employment of Indians during the last six years (Data sourced from MOIA, 2012)

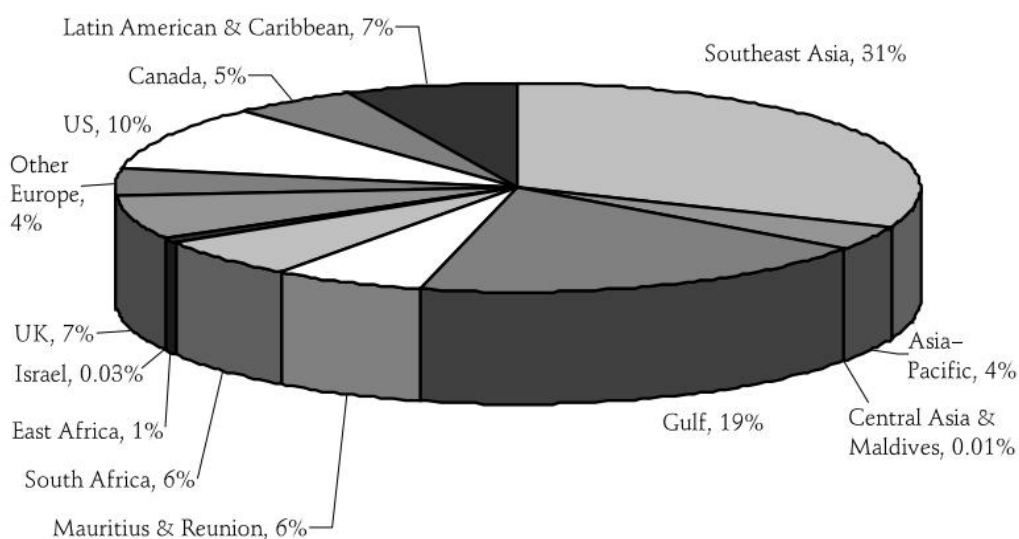


Figure 10. Distribution of overseas Indian (ICWA, 2001, cited in Khadria, 2006)

Historically the large quantity of Indian Diaspora results from several waves of migration: slavery under mercantilism, contract labour under colonization, and guest work programs post colonialism (MOIA, 2012).

5.2 Present situation of brain drain in India

India is exporting talents intensively nowadays and it is believed that India will become the largest suppliers of international talents because of its demographic dividend and Indian's English proficiency (Manpower, 2008).

5.2.1 General statistics and facts of brain drain in India

At 1980s, brain drain was not a matter of much concern because the small migration rate did not influence the country demographically based on the large size of population of India (Khadria, 2010). However, recently the brain migration of Indians has become an interesting topic for increasingly more researchers.

Before the establishment of Independent India, the migration of Indians was mainly dominated by the cheap labour force, which could be called as "brawn drain". However, the

phenomenon of “brain drain” appeared in Independent India as hordes of talents, including doctors, scientists, engineers, teachers, architects, and entrepreneurs, left for developed countries. Till the 21 century, the phenomenon is dominant with the migration of nurses and IT professionals to wealthier countries (Khadria, 2010). The globalization in modern society further enhances the migration of Indians.

For the highly skilled Indian migrants, several English-speaking OECD countries are their favorite destination, viz., the US, Canada, the UK, Australia and New Zealand. Around 80% of talents outflow is directed to the US, and this trend is going to continue in the future. Canada, as closed to the US, is also a popular destination and transition to the US. The UK has been popular for a long time. Although the recession in Britain in 1970s led to the lost of first place of migration destination to the US, increasingly more migrants choose the UK recently. Australia and New Zealand are also attractive destination for Indians as they are English-speaking countries and have relatively loose immigration policies (Khadria, 2010)

It is estimated that in the past 30 years, approximately 36,000 Indian doctors, engineers and scientists have moved to other countries. But this number is underestimated to a large extent because most emigrants are not registered (Iravani, 2011).

The number of Indian born living in the US is increasing rapidly, from 51,000 migrants in 1970 to 1.5 million in 2006. Figure 11 shows the trends of Indian born people who received Lawful Permanent Residence in the United States (Terrazas, 2008). It is clear that although there is fluctuation in different years, the number of Indian born who received permanent residence permit has increased a lot from the year of 2000. The community of Indian born immigrants is now the fourth largest immigrant groups in the US. A large part of the immigrants have naturalized US citizens, e.g. 42% in 2006. Comparing to other immigrant groups in the US, the Indian born immigrants are characterized with higher level of education. Around 75% of the Indian immigrated adults have a bachelor’s degree or higher. The Indian immigrants contribute as significant working force in the US. 75% of the Indian immigrants are adults in their working age. More than 25% of the Indian immigrants are employed as IT

professionals. Among the Indian permanent residence permit recipients, 43.9% of them are employment sponsored in 2007 (Terrazas, 2008).

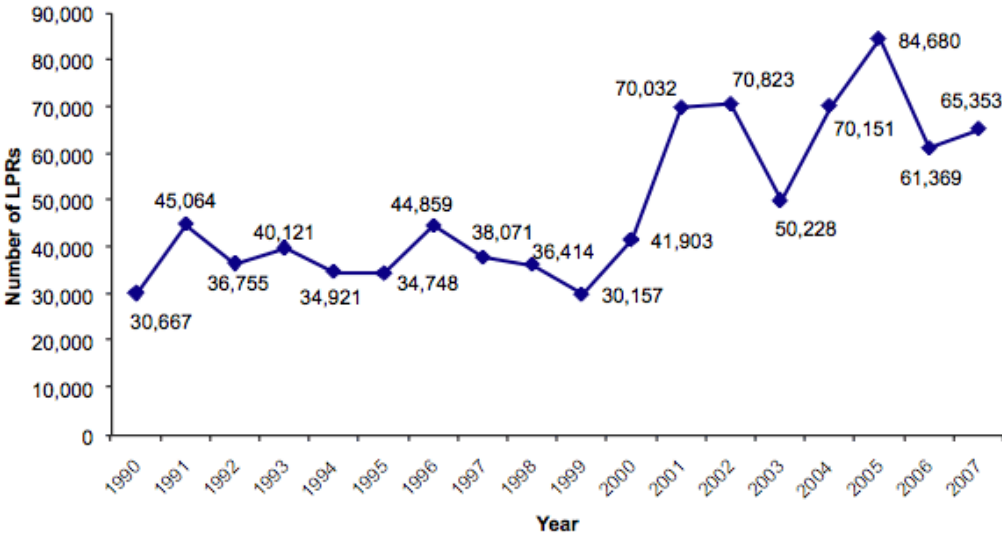


Figure 11. The number of Indian born who received Lawful Permanent Residence in the US (Terrazas, 2008)

Indian is the country receiving the most foreign remittances, estimated to be 55 billion dollars in the year of 2011 (MOIA, 2012). Indian remittances account for nearly 10% of the world total (Khadria, 2006). The international remittances in India have outweighed foreign direct investment and official flows to India, thus the remittances from the Indian Diaspora contribute to India’s economy to some extent. Considering the amount of highly skilled migrants, it is estimated that the remittances will increase further (Manpower, 2008).

5.2.2 Three categories of most migrating Indian talents

According to Khadria (2009), based on several surveys in Indian cities, three categories of Indian talents are more migrating than others, including IT professionals, nurses, and tertiary students.

Information technology (IT) professionals

A community of skilled migrants from India which is under hot debate is the information technology (IT) professionals.

Indian IT professionals are working in many developed countries. Almost 75% of the US's foreign-born IT professionals are from India; 60% of Germany's Green Card Scheme is allocated to Indian IT specialists; around 10% of all the imported IT engineers to Japan in 2003 are from India (Manpower, 2008).

Health workers

Another industry in India severely suffered from brain drain is the health care industry. There are more than 2 million health care workers in Indian, but considering the large population, the nursing density is just 7.9/10,000 population, which is lower than the world standard. The reason that the domestic needs for nursing service cannot be met is not because of inadequate training capacity in India, but because of the migration of trained nurses to other countries (Hawkes, et al, 2009).

There are 769 nursing education institutes in India which provide a three-year nursing diploma program, and it is believed these institutes can supply abundant qualified nurses (Hawkes, et al, 2009). However, the problem of brain drain of health care industry in India greatly impairs its self-supporting capacity. A questionnaire survey of 99 nurses at a private hospital in India in 2007 found that around 20% of nursing labour force are lost due to migration to more affluent countries such as Oman, Saudi Arabia, Singapore, Britain and America. For example, in 2001, 50% of the new registered nurses in the UK are from India, accounting for 0.21% of Indian nursing worker stock (Hawkes, et al, 2009). Another survey of the Indian nursing industry with a sample volume of 448 suggested that more than 63% of the Indian nurses intended to work in wealthier countries (Thomas, 2006). Many surveys of migration of Indian nurses demonstrate that the most important motivation is better payment in destination countries and it is believed that the problem of brain drain of Indian health care industry will not be improved in short time due to the significant global disparities in nursing payment (Hawkes, et al, 2009).

Apart from nurses, a large part of the medical professionals in India also tend to migrate to other countries. India is now the largest exporter of doctors in the world. Within the 68,836 registered doctors in the UK who received medical education and training outside EU, 27,809 of them are from India (Manpower, 2008). Around 4.9% of American physicians and 10.9% of British physicians are from India. Physician in India are not enough to meet the domestic needs. It is estimated that the gap of physician in Indian is over 50%. The number of doctors in the US, where the population is just one fourth of India, is more than that of India (Duttgupta, 2011). A survey of graduates from the India's best medical school-- the All India Institute of Medical Sciences (AIIMS) found that around 54% of the students graduated during 1989 to 2000 were living abroad by the year of 2008, and 85.4% of this group of migrants were in the US. The drain of high-quality medical professionals may have significant impacts of the leadership, training, and managerial capacity of the health care industry in India (Kaushik, et al, 2008). In India, many get India's great training at the few elite schools, such as AIIMS, IIT, and then leave. Compared with Chinese overseas talents generally go to abroad to study and stay abroad, this is a worse type of brain drain, because these people who get India's great training and then leave have occupied limited education resources and opportunities of other people to accept the great education of India

Tertiary students

Despite the university students are just immature work force, a large part of those studying abroad may choose to work in the country of studying and contribute to the severity of brain drain of their country of origin. In 1989, around 11,000 Indian university graduates went to developed countries for further study or work and 25% of these never returned (Dalmia, 2006). The number of Indian students studying abroad was 123,000 in the year of 2006 (Arunachalam, 2008), which is a significant reason of brain drain of India.

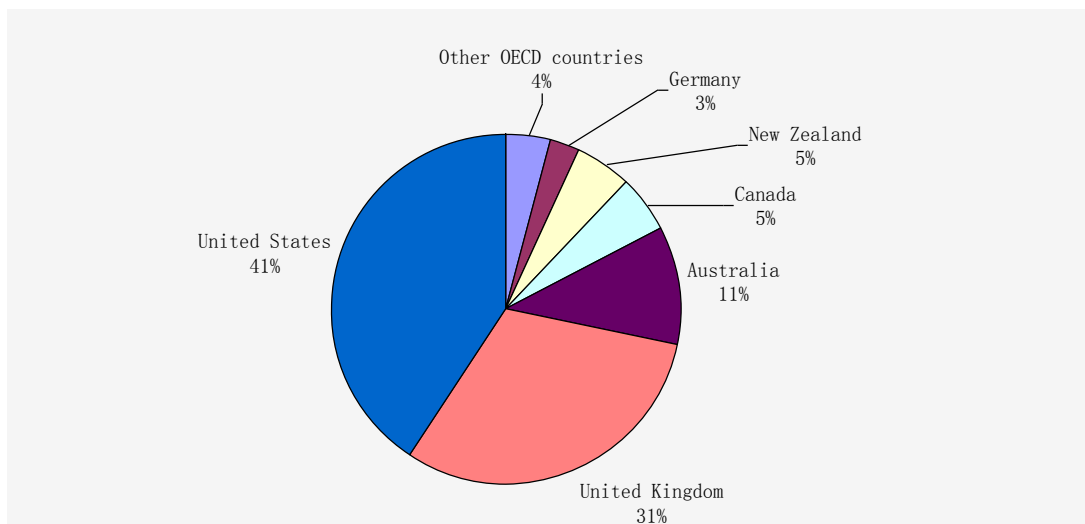


Figure 12. Distribution of Indian students in OECD countries in 2009 (Data sourced from OECD database)

Figure 12 shows the distribution of Indian students in OECD countries in 2009. The most popular destination countries for Indian students are the US, UK, and Australia. Most of the Indian students prefer to pursue their PhD degree in America, with almost half of the Indian doctoral degree holders win their degree from the US (Arunachalam, 2008).

The Open Doors program is run by the Institute of International Education (IIE), an NGO focusing on international education and training. This program is supported by the Bureau of Educational and Cultural Affairs at the US Department of state and publishes results of surveys of international students in America every year (IIE, no date). Figure 13 shows the number of Indian students in the US over years. Detailed numbers are summed in table 6 in appendix. Except for a drop in the year of 2005/2006, and a slight drop in the year of 2010/2011, the number of Indian students seeking education in the US is continually increasing. The number of Indian students studying in the US is always within the top two highest (another large sending country is China) among international students from other countries. In the past most Indian students go to the US with scholarships, but these days their parents are willing to support them to study abroad. The share of Indian students pursuing different degrees in the US is indicated in figure 14. As shown in the figure, most of the students with Indian origin in the US are studying for their master's degree (Arunachalam, 2008).

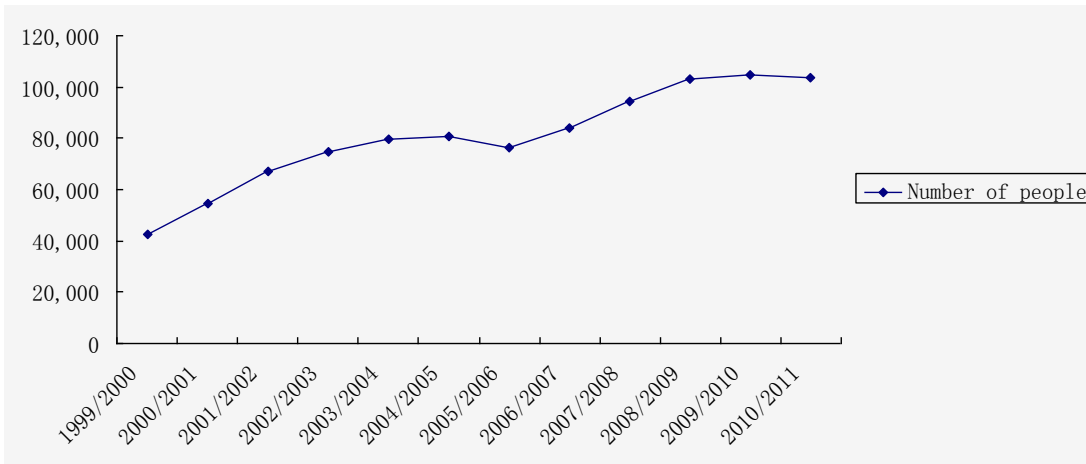


Figure 13. The number of Indian students studying in the US (Data referred from Open Doors Data)

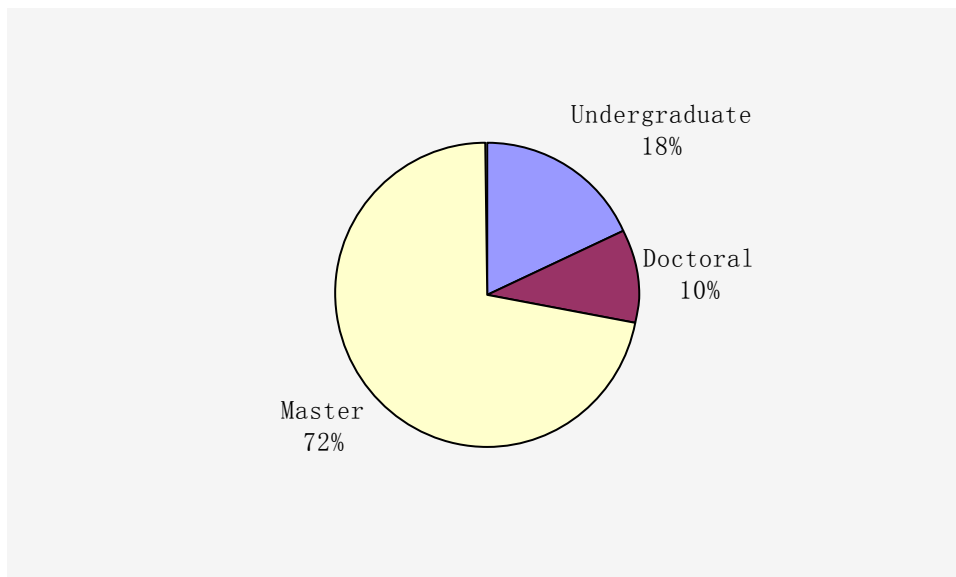


Figure 14. The share of Indian students pursuing deferent degrees in the US (Data referred from Arunachalam, 2008).

Except for the US, other popular destinations for the Indian students are the UK, Australia, New Zealand, Germany and Russia (Arunachalam, 2008). In 2006-07, the number of Indian students in UK is 24,000 (Arunachalam, 2008), while in the 1960s the number is only around 3600 (Sharma, 2010). The number of Indian students in overseas universities is substantial and it has exceeded Chinese in the year of 2007 (Sharma, 2010).

Apart from the students with Indian origin who study abroad, the Indian students studying in home country universities also has high tendency to emigrate. Table 4 shows the situation of

brain drain of Indian graduate in 20th Century. Despite the data is old, it can also indicate that the magnitude of brain drain of Indian tertiary students is high, especially students from medical institute.

Table 4. The 20th Century brain drain of Indian graduate (Khadria, 2009)

Indicators	Indian Institute of Technology Bombay, Mumbai	Indian Institute of Technology Madras, Chennai	Indian Institute of Technology Delhi, New Delhi	All India Institute of Medical Sciences, New Delhi
Batches of graduates	1973-1977	1964-1987	1980-1990	1956-1980
Year contacted for survey	1987	1989	1992	1997
Magnitude of brain drain	31%	27%	23%	56%

5.3 Reasons of brain drain in India

Important factors

Khadria (2010) analyzed factors influencing the migration of Indian talents to OECD countries and summarized the relative importance of these factors under the current circumstances of India and OECD countries. See table 5. According to his analysis, relatively important factors with regard to the future brain drain of Indian talents into OECD countries are demography, tertiary education, climate change, dual citizenship, and the unstable immigration policy changes in OECD countries. The factors which are not so influential are economy, standard of living and policy and government of India.

Table 5. Expected relative importance of factors in future brain drain of Indian into OECD countries (Khadria, 2010)

Factors	Relative importance	Reasons
Demography	High	Demographic Dividend
Economy	Low	Insulated from external shocks; Low dependency on remittances
Tertiary	High	Ambitious targets of tertiary enrolment;

education		Large number of middle-class students escape from under-supply and low quality education
Climate change	High	Coastal and inland flooding can displace large masses; Shortage of “green jobs” in OECD
Standard of living	Low	Avenues for maintaining higher standards are plenty inside the country
Dual citizenship	High	Will facilitate greater mobility
Policy & government	Low	Democracy and civil liberty
Unstable immigration policy changes in OECD countries	High	Can cause graduate unemployment due to sudden restrictive immigration

Demographic pressure

It is estimated that till 2030, India’s population at working age (15-64) would increase by 33% as compared to 2005. As a result, more people would have to emigrate in order to get a job if the domestic labor market does not expand at the same time. According to the estimation of the Registrar General and Census Commissioner of India in 2006, the population of India will increase by 36% in 2026 compared to 2001, and the share of population aging from 15 to 59, who are suitable for working, will increase by 83%. See the projected population pyramid of India in 2026 in Figure 15. This is supposed to be enjoyed as “demographic dividend” for India. However, it would be a huge challenge for India to absorb so many youth for employment (Khadria, 2010).

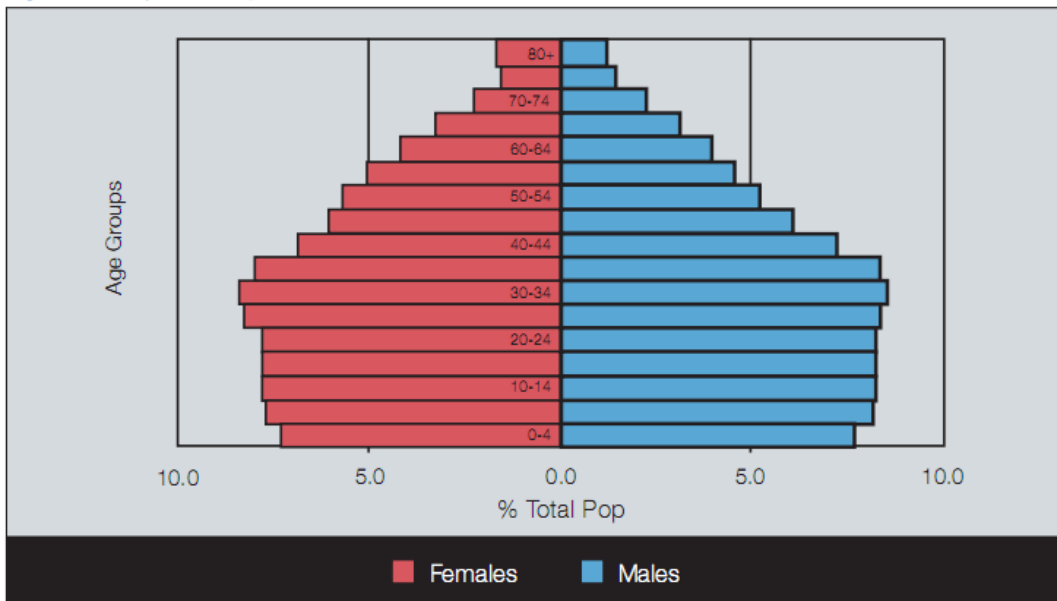


Figure 15. Population Pyramid of India in 2026 (Manpower, 2008)

Domestic career and professional opportunities

The high emigration rate of Indians is stimulated by the lack of career opportunities in India. The unemployment rate in India is high. In 2001, there are 45 million Indian people was unemployed, among which more than 10% were university graduates. The unemployment rate of graduate in 2010 is 17.2% in India, which is much higher than the overall unemployment rate. Even worse, almost 40% of Indian graduate are underemployed, which means a large part of graduates is not productively employed. (Khadria, 2010).

Apart from career opportunities, the highly skilled talents cannot earn high salary in India as their income is controlled forcibly by the government to “maintain an egalitarian income policy”. The professional development opportunities are not that good in India as well because there’s an atmosphere in India that people get job opportunities trough personal contacts rather than their abilities and skills (Iravani, 2011).

Weak education and training capacity

According to Arunachalam (2008), one of the reasons for the Indian students to study abroad is that the education capacity of India cannot meet the domestic demand. The universities in India do not have enough professional courses for their students. There are only about 400 universities in India while the population is more than 1.1 billion. In 2008, more than 311,000

students took examination to compete for one of 6,872 places in Indian Institutes of Technology. Apart from the quantity of universities, the quality of Indian education, except for the few elite institutions such as AIIMS, and IIT, is also perceived to be relatively inferior to overseas education (Arunachalam, 2008). It is also a reason for the students seek education abroad.

Despite India has the advantage of demographic dividend, it may not have the infrastructures to train and educate the massive youth into employable dividend. It is due to two drawbacks of Indian education system. Firstly, the general education quality is low across the country which leads to low levels of employability of the graduates. Secondly, drop-out rate is as high as 90% in India (Manpower, 2008).

Skill training opportunities are also rare in India. According to the 11th plan document of the government of India, only around 2% of Indian youth, aging from 15 to 29, have received formal vocational training, and 8 % of them have received non-formal vocational training. It is quite low compared to many other countries: the parameter in Korea is 96%, in Japan is 80%, and in the US is 68%. (Manpower, 2012).

5.4 Impacts of brain drain to India

The assessment of the impacts of brain drain to the Indian society is not an easy task. There haven't been systematic impact assessments of brain drain to India, but some partial effects have reflected in the following aspects.

- **Talent shortage**

As India is under the transformation to a knowledge economy, there are large gaps of talent shortage, and this situation is further deteriorated by brain drain. The shortage of talent is observed and anticipated in many sectors in India, for example it is estimated that there is 25%-40% shortage of faculty members in Indian education sector, including teachers and researchers in engineering, management, economics and computer science (Manpower, 2008).

- Impact on economic development

Indian students prefer IT to many other fundamental subjects. For example, Mr. Naik, chairman of Larsen & Toubro, India's leading capital goods company said "It seems engineering and management graduates in India do not want to dirty their hands any more by working for a manufacturing firm". Less and less students are interested in hardcore engineering in India nowadays since the salaries for this type of jobs are relatively lower in India. This fact has reflected in GDP of India as the share of manufacturing in India's GDP is 17% while that is 50% in China, 45% in Korea, and 40% in Thailand. However, IT just contributes for 4% of India's GDP. This means many Indian students studied IT at home and go abroad to work (Iravani, 2011).

- Fiscal losses

The investment on education of high quality manpower is much higher than the investment for a low skilled worker. However, talents with high educational level are just those to like to migrate. This results in wastes of education expenditures in India (Manpower, 2008). According to estimation by Desai et al (2009), the fiscal impact of brain drain of India to the US is 2.5% of the total fiscal revenues in Indian.

- Impacts on the domestic basic services

The emigration of trained doctors, nurses and teachers from India also results in shortage in basic services in India (Manpower, 2008).

5.5 The attitude and policies about brain drain of Indian government

Instead of crying about the brain drain of India, the Indian government tends to look at this phenomenon from a more optimistic perspective. They believe the overseas Indians are part of India's "brain bank" and always endeavor to establish connections with them. In 2010, the Indian Prime Minister Manmohan Singh said that the problem of brain drain of India is no longer disturbing, but India benefits from the global brain bank of people of Indian origin (PTI, 2010, a). Economist Jagdish Bhagwati (2012) assists that the fear of brain drain is misplaced. As migration is a kind of human right and the fact of brain drain cannot be changed, the government should maximize the welfare from the migration of people, instead

of restricting people to migrate or being pessimistic over this phenomenon. Poor countries with inadequate educational capacity could benefit from the people who are educated abroad. The challenge is to attract the well-educated people back or to make connections between the expatriate talents and their home country (Jagdish Bhagwati,2012).

India's attitude on the emigration of talents has changed over time. During 1960s to 1970s researchers are talking about "brain drain"; during 1980s to 1990s "brain bank" is under hot debate; in the 21th centuries the topic has turned to "brain gain" (Khadria, 2006).

Ministry of Overseas Indian Affairs (MOIA) of the government of India was established in 2004. It is dedicated to the overseas Indians, with the aim to build connections between India and Indian Diasporas. The MOIA has four functional service divisions: Diaspora Services, Financial Services, Emigration Services and Management Services. Besides serving the overseas Indians, the minister also intends to promote the connection with overseas Indians in terms of investment, emigration, education, culture, health, science and technology (MOIA, 2012). Since 2003, the MOIA organizes an event called Pravasi Bharatiya Divas (PBD) every year aiming to establish connections between India and Indian Diaspora. Delegates of Indian Diaspora and relevant dignitaries are invited to a three-day convention to discuss about the engagement of overseas Indian to the development of their home country. In the PBD convention, the Pravasi Bharatiya Samman Award (PBSA) is conferred on overseas Indians, including NRIs, PIOs, and Organizations or Institutions who have excellent contribution in their area of expertise and have contributed to enhance the prestige of India in their host countries. In 2012, 15 PBSA were awarded (MOIA, 2012).The Know India Program (KIP) is also run by MOIA. This program intends to the youth (aging from 18 to 26) of India Diaspora to get familiar with India. Tens of overseas Indian youths are invited to the program with hospitality and reimbursement of air-fare. A series of activities such as presentations and visits are implemented to familiarize the youth with Indian culture. Until 2012, MOIA has carried out 19 KIPs and almost 600 overseas Indian youth have joined in them (MOIA, 2012). Overseas Indian is the house journal of MOIA. It is published in five different languages and e-versions are available (Khadria, 2006).

In August 2005, an Overseas Citizenship of India (OCI) Scheme was launched aiming to “provide for registration of all PIOs as ‘Overseas Citizens of India’, providing they were citizens of India on or after January 26, 1950 or were eligible to become citizens of India on January 26, 1950 and who are citizens of other countries, except Pakistan and Bangladesh” (MOIA, 2012). From January 2006 till February 2012, more than 1 million PIOs have been registered as OCIs. OCIs are similar as dual citizenship holders as “a registered Overseas Citizen of India is granted multiple entry, multi-purpose, life-long visa for visiting India, and is exempted from registration with the Foreigners Regional Registration Office (FRRO) for any length of stay in India”. (MOIA, 2012) With convenient mobility, the OCIs could help India in a better way. This policy effectively promotes the utilization of the overseas talent’s skill in the development of India.

6. Reverse brain drain

This part discusses the phenomenon of Reverse Brain Drain, which has inherent relationship with Brain Drain (Giannoccolo, 2004).

6.1 The phenomenon of reverse brain drain

Brain drain is not permanent. On the contrary, these days more anecdotal evidence shows the inherent opposite of brain drain, which is brain return, or reverse brain drain. Reverse brain drain happens when the talents migrate to their home countries. Usually reverse brain drain refers to the talent flow from developed countries to developing countries. It is believed that reverse brain drain is within the top mega trends of the world in the near future (PTI, 2011). The highly skilled workers who work abroad have strong commitment to go back to their country of origin (Glaser, 1978, cited in Giannoccolo, 2004).

America is in long time regarded as the most popular destination for migrating talents, but reverse brain drain has been noticed even before the economic crisis in 2008. Previously it seems talents from developing countries, such as China and India, prefer to stay permanently in the US, but these days a large proportion of them have started to return (Wadhawa, et al, 2009). Expatriate talents are returning their native countries and working as senior staffs (PTI, 2011). Although the exact volume of reverse brain drain is hard to define, it is believed that nowadays tens of thousands of skilled workers are leaving the US for their home countries every year (Wadhawa, et al, 2011). There is no official figures available now, but according to Cervantes and Guellec (2002), the number of return of Indian talents is still very low compared to those emigrated.

6.2 Motivations to return

The reasons of brain drain are various, and the motivation for the talents to return is not the same under different circumstances. There are many researches concerning the motivation of

reverse brain drain, but they always come to different conclusion and ranking of the influencing factors as peoples' weltanschauung is so diverse.

In 2008, a survey of 1,203 Chinese and Indian returnees from the US founds that that the most important motivations for talent to return were career opportunities, family ties, and quality of life (Wadhawa, et al, 2009). 86.8% of the Chinese respondents and 79% of the Indian respondents indicated that the demand for their skill in their native countries was increasing and most of them believed they could have better professional opportunities at home countries than in the US. Family ties are also important incentives to return (Wadhawa, et al, 2009). Most of the returnees claimed the conditions to care for their aging parents are better at home country and most of the respondents reported the opportunities to be close to family and friends are strong considerations (Wadhawa, et al, 2009). Another significant factor is the quality of life. The Chinese respondents indicated that difficulties such as language barriers, missing of family and friends, cultural assimilation and so on are likely to decrease their quality of life in the US, and for Indian respondents, difficulties are mostly from the loneliness and missing of family, cultural assimilation and so on (Wadhawa, et al, 2009). Surprisingly the restrictive immigration policies of the US only represent a small influencing factor in the decision of return (Wadhawa, et al, 2009). More than half of the respondents expressed that they would like to start their own business in the near future, and they believed the environment for entrepreneurship was better at home (Wadhawa, et al, 2009).

In 2011, Wadhawa et al did another survey of Chinese and Indian returnees from the US aiming to investigate further of the motivations of reverse brain drain. This time they found out that economic opportunities are the most important driving force for returning home. 90% of Chinese respondents and 60% of Indian respondents indicated the better availability of economic opportunities at home is the foremost factor. Apart from the economic consideration, Indians also highlight family ties as major influencing factors in the decision of return while Chinese respondents attach more importance to the access to the large domestic market (Wadhawa, et al, 2011).

Chappell and Glennie (2010) identified three reasons driving talents to return: improvement of situation in country of origin, the sense of belonging to the culture of home country, and the achievement of a specific purpose. Firstly, if the situation of their country of origin (e.g. economic, political) is improved, most skilled migrants are willing to return. Secondly, the feeling of belonging to specific culture and patriotism also make the expatriate want to go back. This kind of motivation is particularly significant for skilled migrants from poor countries and young professionals and students without family ties in the host country. Thirdly some migrants would like to return after achieving of a specific goal. This is strong incentives for entrepreneurs who have family in the country of origin (Chappell and Glennie, 2010).

6.3 Reverse brain drain to China

China is regarded as the largest receiving country of reverse brain drain and brain circulation from the beginning of the 21th century. Chinese government and local governments implement many policies and programs to attract overseas talents going back. For example, the Thousand Talent Scheme from 2008 has attracted more than 10,000 overseas high quality talents back (China Youth Daily, 2012).

The number of Chinese students returning with a foreign educational background is increase in recent years: 108,000 in 2009; 134,800 in 2010 and 186,200 in 2011. See figure 16 for the trend of returnees. The number of returned Chinese international students jumped from the beginning of 21th century and more rapid growth is observed recently. Figure 17 shows the trend of return rate of Chinese international students. A reverse U-shape is observed from 1993 till now. The turning point is at the year of 2006 when the return rate starts to increase.

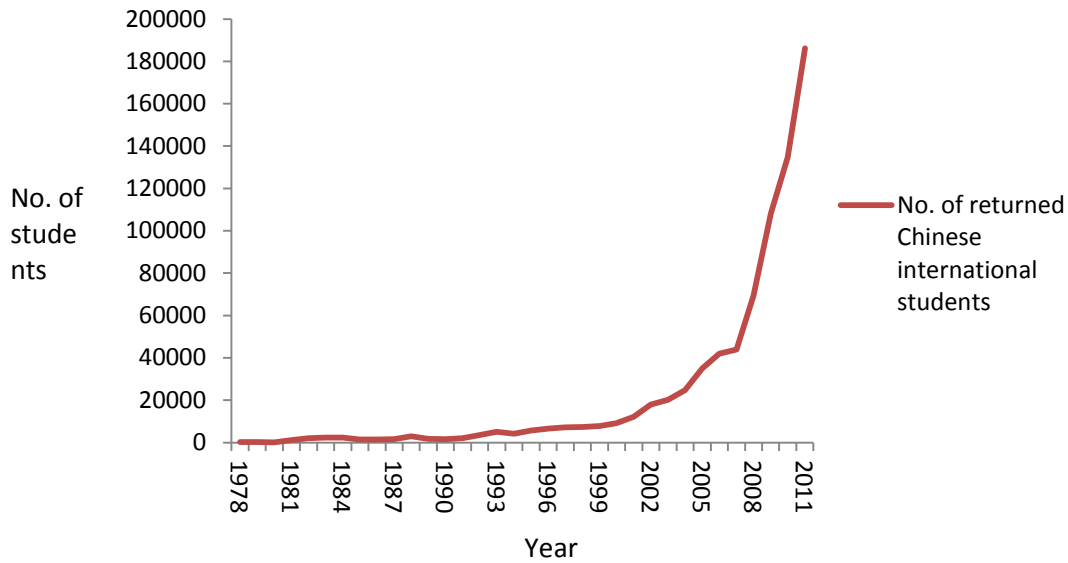


Figure 16. The number of returned Chinese international students (data sourced from web of Chinese Ministry of Education)



Figure 17. The return rate of Chinese international students (data sourced from web of Chinese Ministry of Education)

The sum of returned overseas Chinese international students has reached 818,400 since the reform and open-up from 1978. (China Youth Daily, 2012).

More than 80,000 Chinese doctoral degree holders with international experience have returned from developed countries and work in laboratories in China. These talents contribute heavily to the development of science and technology of China. It is estimated that till 2015,

the investment on Research and Development in China would account for 2.2% of Chinese GDP, and the main focus would be on the field of new industries such as nanotechnology, clean energy, and research on stem cells. A lot of advanced research centers and laboratories are established. The improvement of research facilities is also an important incentive for the researchers to return (Global Times, 2011).

6.4 Reverse brain drain to India

Compared to brain drain, the topic of reverse brain drain is under hotter debate in India nowadays. The Indian Minister of State of Corporate and Minority Affairs Salman Khulshid said “Reverse brain drain has already begun and it is a great sign of the world's confidence in India and its recognition of India's potential”. He also added that "many second-generation Indians are coming back to the country. Top multinationals are sending their top Indian minds to head their companies in India. So when we lose some, we win many back" (PTI, 2010, b)

During the colonial period (1830 - 1930) around 30 million Indian people left their country, but finally 24 million returned to South Asia. Despite of the large number of Indian migrants residing in wealthier countries, a significant part of them have returned from the Gulf region or the US (Trumpbour, J., 2007)

The pharmaceutical industry in India has been benefit from the reverse brain drain. Surveys of three most leading pharmaceutical companies in India found out that most of their PhDs in Research & Development (R&D) sectors were graduates from American universities. In a country where labour and facilities cost fewer, the trained returnees helped these pharmaceutical companies to be competitive on global market. The cost of developing a new drug is lowered to 300 million dollars, comparing to 1 billion dollars in the US. The pharmaceutical companies feel optimistic to recruit the returnees and the pharmaceutical talents are willing to go back because they have seen better professional opportunities in their home country. Many state-of-art laboratories are established, making innovative research

and development work to be possible. The excitement of contributing for the rapid economic development of their motherland and the sense of belonging has also driven the talent to return. (Trumpbour, J., 2007)

Decades ago the Silicon Valley in the US attracted many well-educated IT specialists from Indian, but these days media reports release news of reverse brain drain back to India. It is estimated that in the year of 2009, there were more than 60,000 Indian professionals going back to their country and most of them are from IT industry. The majority of these returnees are in their thirties to forties, and most of them are middle or senior-level manager in their field. Some of them go back because they want their children to grow up in Indian culture while the others claim that they want to contribute to their country's innovation (Ahmed, 2010). The burst of IT bubbles at the beginning of 21 century in America made many NRI lost their H-1B visa contracts and went back home. Multinational companies realized the rapid development of India and came to set up subcompanies, which also lead to a wave of reverse brain drain back to India (Khadria, 2010). To a great extent, the rapid development of IT industry in India has benefited from its return IT professionals. At least 35,000 IT specialists have returned to Bangalore, the key IT center in India. 30% to 40% of higher level staffs in Indian software companies are returnees from developed countries (Manpower, 2008).

Despite some policies aiming to attract expatriate talents are implemented, the number of return is still low. In the year of 2000, around 1500 Indian professionals returned from the US, but more than 30 times of people depart annually (Cervantes and Guellec, 2002). Some researchers also argue that the reverser brain drain to Indian is not long lasting due to the fact that returnees tend to go back again (Khadria, 2006).

7. Impacts of global recession on brain drain

The global financial crisis which began from 2008 till now has be consider as the worst global financial crisis since 1930 (International Monetary Fund, April 2009). It has caused global economic recession. Some relevant phenomena have been observed in many countries, such as shrinkage of government revenues, bank failures, market atrophy, shut down of factories, reduced investment, and increasing unemployment rate. Many countries, especially developed countries, are facing the challenges of economic recession difficultly (Dick K. Nanto, 2009)

7.1 Impacts for the overseas talents

The global financial crisis has great impacts for the world. It also influences the phenomenon of brain drain. Overseas talents have been influenced both in political and economical aspects.

7.1.1 Political aspect

In the financial crisis, migrants are vulnerably influenced by the political policies. It is because in the crisis, governments always lose citizens' confidence. They need to find out some ways to solve the associated social problems (such as increased unemployment rate, anemic economic growth and shut-down of factories) and to redeem confidence and vote of population. Under the pressure of the public, many countries' governments tend to make policies which are protectionist and against globalization. Parts of these policies, especially those about migration, have deeply influenced the skilled immigration.(Lucie, William, 2009)
In this part ,some counties' policies are analyzed.

Australia

The economic growth in Australia has fallen down in the financial crisis. The economic growth rate was reduced by 4.6% in the year of 2008 (Trading Economics, 2010).



Figure 18. Australia GDP annual growth rate
(Trading Economics, 2010)

At the same time, unemployment rate in Australasia increase to 5.9% maximally.



Figure 19. Unemployment rate in Australia. (Trading Economics,2011)

Many Australians think immigration has damaged their right of work. Under the public voice of tighten immigration policy, Australian government has announced a series of policies to reduce immigration. The following are some examples.

- Economic-stream immigration was reduced from 133,500 to 115,000((Migration News,

April 2009)

- The “needed skills” list has been cut down greatly, leaving only health occupations, engineering and information technology skills on the list.(KHALID KOSER, July 2009)
- Through increased the Minimum Salary Level (MSL) of immigration, the Australian government has restricted the application to immigrate and renew of work permits (Australian Government, 2009).
- Employers have to give priority to native workers under the same conditions (Lucie, 2010).

United States

The US economy has suffered a serious defeat in the financial crisis. This chart shows US GDP growth rate have fall from 2.5 % in 2007 to -5 % in 2009.

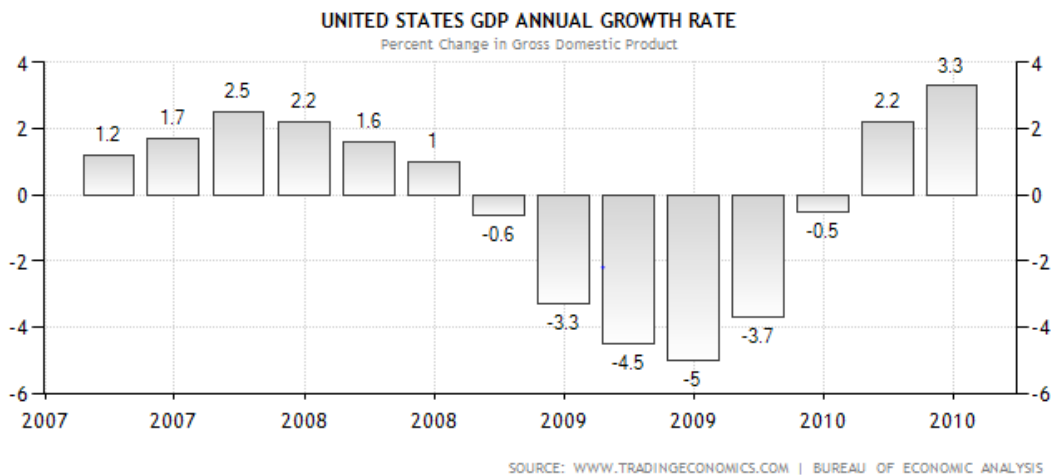


Figure 20. United States GDP annual growth rate (Trading Economics, 2010)

Although economic rebound emerges in the US after 2009, the unemployment rate increased from less than 5% in 2007 to more than 9% after 2009 and did not seem better after 2011. See figure 21.

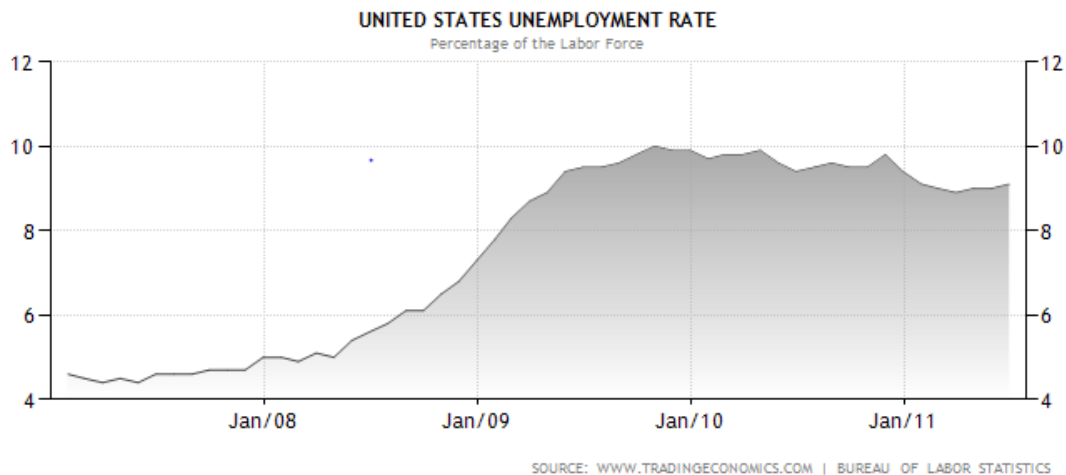


Figure 21. Unemployment rate in the US (Trading Economics, 2011)

Under the pressure of low economy growth rate and high unemployment rate, many politicians call for an economic stimulus package and tighter immigration policies. A number of politicians even call for stop the H-1B programme (most highly skilled migrants have come under the H-1B programme) to rise domestic employment rate. (Lucie, William, 2009)

After Congress debate, some tighter immigration policies of H-1B programme were approved. New restrictions include (Herbst 2009):

- Employers have to provide job priority to native employees if they have equal or better qualification than the foreign employees.
- Employers can not hire foreign personnel through H-1B programme if they have fired a similarly native employee before or after three month.
- Employers cannot arrange their foreign employees who are holding H-1B visa to work in other companies. This policy means employers could not arrange foreign employees to work for their clients.
- Employers must pay native employees equally or more salary than foreign employees who hold H-1B visa.

United Kingdom

UK is the harder-hit area of financial crisis. After 2007, UK GDP growth rate have fallen from

4.2% in 2007 to -6.9 % in 2009 (Figure 22).

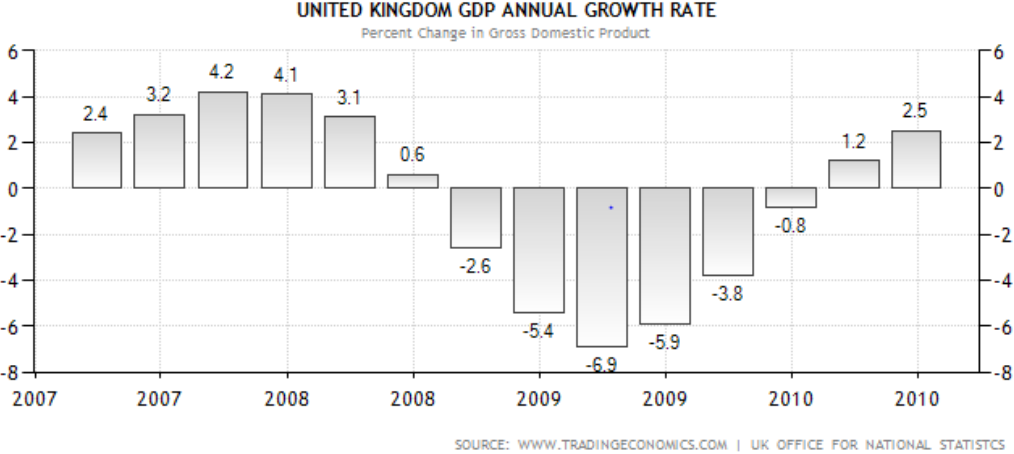


Figure 22. United Kingdom GDP annual growth rate (Trading Economics, 2011)

As the crisis has deepened, UK unemployment has reached 8.4 % which is the highest point after 1998 as shown in figure 23.

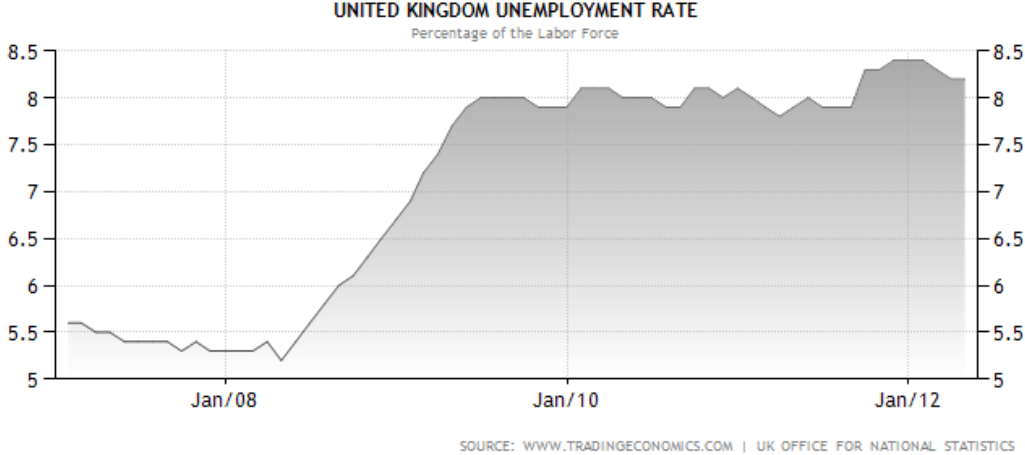


Figure 23. Unemployment rate in United Kingdom (Trading Economics, 2012)

Facing the serious situation, UK government has made rapid responses. Government and many public consider high skill immigrant as an important reason of high unemployment rate (Migration News , 2009).

Headed by Prime Minister Gordon Brown, many senior officials said UK must adopt some policies to protect UK workers' benefit.

Gordon Brown has promised "British workers for British jobs".(Migration News, 2009) Former Home Secretary, Jacqui Smith think policies need to ensure no-EU migrants could not get a skill job if the job did not advertise to British workers at first(BBC, 2009). Immigration Minister Phil Woolas announced that the government decided to ensure "migrants only works if it is beneficial to the British people" (Migration News, April 2009)

UK government passed some restrictive immigration quickly, such as: If employers want to recruit, they must advertise their job vacancies in labor employment agency at first; Government raise the qualification and salary requirement for migrations who want to work in UK (Migrations must have master degree and £20000 annual salary at least (BBC, 2009); Foreigner employees who do have citizens or permanent residents are not eligible to have full services benefits and social housing (Plaza, 2009); Foreigner employees have to pay more tax for local services (Plaza, 2009).

Through the analysis of the three countries' policy response on migration in the financial crisis period, we can find out that political factor has profound influences on the oversea talents.

7.1.2 Economical aspect

In the financial crisis period, oversea talents will be influenced by the economic factors as well. Three important parts are discussed below.

- The job market gets shrinking

In the financial crisis, many companies face dilemma because the international market gets

shrinking and banks tighten up credit standards. Many companies have to reduce cost through lay off employees and some companies are even shut down completely. (James B. Bexley, 2010) The unemployment rate in most leading economies has a big increase.

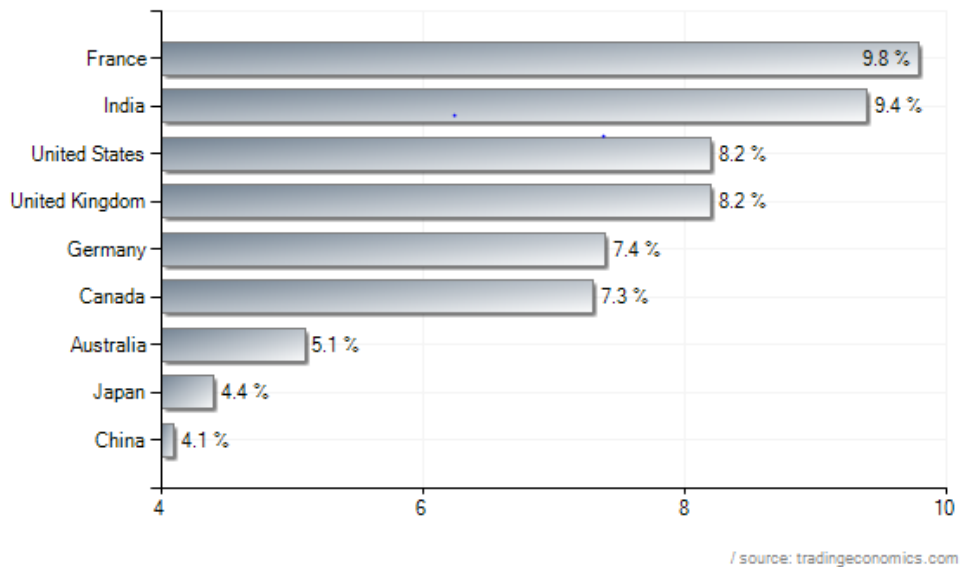


Figure 24. Major economies' unemployment rate (Trading Economics, 2012)

Except for the increased unemployment rate, overseas talents have to face governments' policies of encouraging employers to hire native employees. So many Chinese and Indian overseas talents can hardly find a job or some of them can just find a job with low income.

- Funds of research have decreased

In the financial crisis, many funders decrease or even stop their investment for research (Mary, 2010). Many Indian and Chinese overseas researchers could not get enough funds to continue their research.

- Welfares have been reduce

Overseas talents also have to face the problem of their working countries' welfares decreasing. Some countries even announce policies to reduce welfare of foreign employees especially.

7.2 Impacts for talents who want to emigrate

Figure 25 shows the number of US's international students from the top three places of origin from 2000 to 2011. Through this figure, we can find out that while the number of students with Indian origin leveling and the number of students with South Korea origin decreasing, the number of Chinese students go to American for study has a rapid increase from 2008. And go to abroad to study is the most important way of Chinese talents flowing abroad.

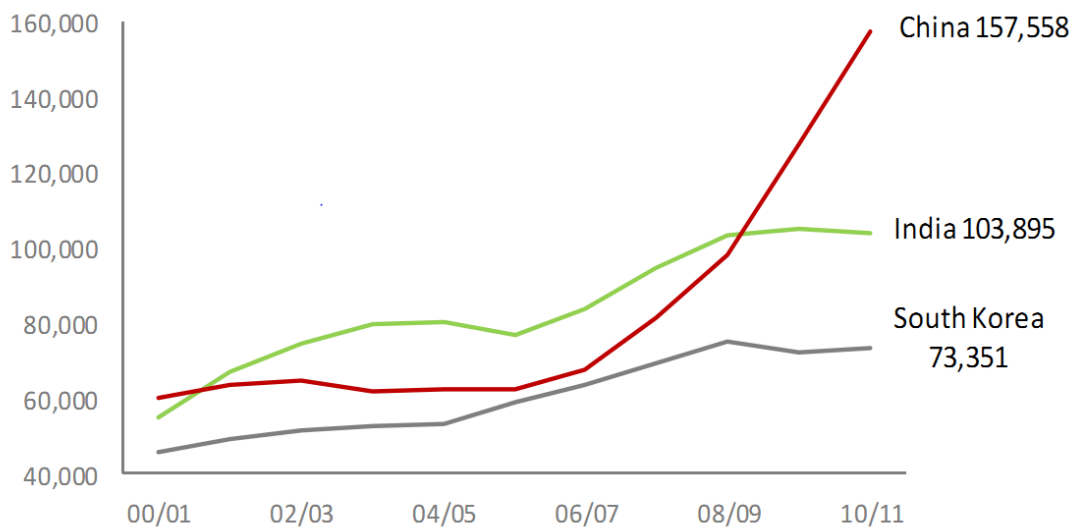


Figure 25. Top 3 Places of Origin of international students of US (Institute of International Education.2011)

There is not enough data to analyze why the number of Chinese students going to American for study has a rapid increase in the financial crisis. But on the basis of some news reports, many companies shut down or cut down employees because the international market shrinkage and exportation gets influenced heavily. Many graduates could not find a decent job. According the report of Ifeng, there are 6.1 million graduates in 2009 and more than 1.5 million graduate students did not find a job. Under this background, going abroad to pursue advanced studies has become a important choice of many fresh out graduates. (Ifeng,2009)

8. Discussion

8.1 Availability of brain drain data

During the formulation of this thesis, I tried to collect comparative data about brain drain in both China and India. However, it is found usually brain drain data, e.g. number of emigrated population with tertiary education level in a certain year, is difficult to get from systematic statistics. Apart from the emigration data, the impact of brain drain is even more difficult to compare. The data sources of brain drain in China and India are mainly scientific literature, thus the data collected is segmentary and difficult to compare.

According to Carrington and Detragiache (1998), brain drain data is very difficult to get because the statistical way to track number and characteristics of migrants is not uniform in different countries and usually sending countries do not keep track the skilled emigrants. Wickramasekara (2002) also asserts reliable brain drain data is scarce because no country has established a comprehensive recording system of the talent flow.

Therefore, in order to get a more accurate assessment of the magnitude of brain drain in any country, the prerequisite is to establish a harmonized recording system of the talent flow internationally.

8.2 Different policies of Chinese and Indian governments

The government of China and the government of India have very different attitudes about brain drain. The different attitude and policies of Chinese government and Indian government made these two countries' brain drain problem have many difference. Chinese government and Indian government implement many policies about brain drain. Some typical policies are analyzed below:

- The different policy of nationality

Chinese government implements a very strict policy of nationality to prevent brain drain. Nationality Law of the People's Republic of China stipulate “any Chinese national who has settled abroad and who has been naturalized as a foreign national or has acquired foreign nationality of his own free will shall automatically lose Chinese nationality” (Nationality Law of the People's Republic of China, Title 9, 1980). Chinese government wants through this law to prevent Chinese talents who study abroad from joining other countries’ nationality and becoming other countries’ talents. But this law did not achieve its purpose. Many Chinese talents also naturalized nationality of other countries because they want better living and working conditions. China does not successfully prevent brain drain through its strict policy on nationality. Just the reverse, many Chinese oversea talents’ national identity and sense of belonging receded, because they lost Chinese nationality (Ifeng, 2011). And single nationality policy created a major barrier for oversea talents to work for China. When oversea talents want to come back to China, they will face with many red tapes of Visa and many other troubles. So many Chinese oversea talents who want to come back could not be back. (William, 2001) Although there were some scholars and delegates of the National People's Congress (NPC) proposed to admit dual nationality or expand approval for permanent residency, the Chinese government has not approved dual nationality policy till now.

The Overseas Citizenship of India (OCI) Scheme implemented by the Indian government from August 2005 is similar as dual nationality policy. Holders of OCI can enter India conveniently without apply for visa every time. This policy promotes the talent mobilization so the overseas Indian talents can come back and work for their home country more conveniently. Compared with Chinese government’s nationality policy, Indian government’s nationality policy is more reasonable and more effective for solving brain drain problem. The dual nationality does not only allow overseas talents work for home more conveniently but also increase oversea talents’ national identity and sense of belonging.

- The different policy of funding support for research

Chinese government is keen to attract oversea talents coming back through support for their research. Chinese government invests an enormous sum of money and set up a great number

of projects to support high-tech talents' research in China. Many personnel even got support from more than ten projects. Except the support from central government, local governments also invest huge number of money to attract oversea talents. Funds for any projects are more than 1000 million RMB. (Pang, 2004)

Indian government is less vocal regarding investment of support oversea talents' research. It seems that they hope their overseas talents to use other countries' resources to do research rather than do research with their own investment, because there are few projects to support Indian overseas talents to return and do research work. It may be related to the "brain bank" definition of Indian government. They are more inclined to attract overseas talents come back with mature technology, managerial experience and capital. Indian government has built overseas experts database in main developed countries to find experts who can help India to solve problem of major projects when needed. (China.com, 2007) They have invested much money to established techno-parks in Bangalore, New Delhi and Hyderabad etc. The government of India wants to attract overseas Indian talents bring money, technology, experience back and run companies in these techno-parks. Indian government also published many preferential policies to support overseas talents to establish their companies. In recent years, Indian overseas high-technology talents have on average invested 200,000 dollars into techno-parks in Bangalore, New Delhi and Hyderabad annually. (China.com, 2007) Chinese government focuses on supporting overseas talents coming back to do research work, while India government focuses on encouraging overseas talents bring capital, technique back to run business. It maybe because India government has a more open viewpoint about talents than Chinese government.

- Different policies to serve overseas talents

Chinese government established service centers for oversea talents. Overseas talents could get many kinds of service from these centers (Chinese Service Center for Scholarly Exchange, 2012). And Chinese government also published a series of policies to serve overseas talents, include housing, research trip, household registration, children's education etc. Chinese government seems want to provide service to overseas talents in every aspect (ZWEIG,

2006). They want through these services to remove barriers of overseas talents return.

India government also does some useful work to service overseas talents. Indian government through built residential for overseas talents, offering preferential and free medical service and reduce tariff for overseas talents to attract overseas talents return(Yang,Du,2009). But compared with Chinese government's measures, Indian government's measures are lack of special government department to implement and administer. So Chinese government's measures are more effective and stable.

- The different policy of improved higher education and research environment

Chinese government believes improving higher education and research environment is an important way of foster, retain and attract talents. They think it a good process to solve brain drain problem. Begin from 1990, Chinese government has run the project of "211". This project plans to support 100 Universities to improved teaching facilities and physical infrastructure. Begin from 1998, Chinese government decided to invest more money to support 34 Universities to be a first-class university in world.(Chinese Ministry of Education, 2012)

Indian government also puts a high value on improving higher education and research environment in recent years. In 2009, Indian finance minister announce Indian government will increase 55% of investment in higher education, and India government found it an interest way to improved higher education and retain talents.(ifeng, 2009) Indian government announced they were developing a new law that relevant education field open. This new law will break the strictly limitation in higher education field and allow foreign universities to establish overseas campuses in India. Indian government believes many famous universities are interested to establish overseas campuses in India. They think through this way, Indian students could get top-quality education interiorly and could solve the problem of overseas students not coming back.(ifeng, 2009)

Through the comparison, we can find out that the Chinese government and the Indian government have greatly different attitude regarding their overseas talents. Indian government's viewpoint is that the overseas talents also are the "brain bank" of India, even if they live abroad and work for other countries. It seems Indian government is more inclined to support overseas talents bring technique, capital and management experience back and help India's development. Indian government is also more inclined to use foreign capital to help them to foster talents. However the Chinese government highlights the role of talents and considers talents are the power of development. China needs many talents to work for Chinese people, needs them to work domestically to support development, reformation, and social transformation of China. If talents work abroad, they can only provide limited support to China. Therefore Chinese government invests great amount of resource to attract overseas talents going back after graduation. Different attitude and policies of governments cause brain drain of India and China appeared some different features. Through the open nationality policy and some positive policies, Indian government successfully attracts many overseas Indian coming back to invest and run business. Chinese government also through its effective policy of funding support and service successfully removed barriers of many talents from coming back. However, the policies of the two governments are still deficient in some aspects and needs to be improved further.

8.3 What Can Developing Countries Do?

To cope with the negative effects of brain drain, challenges to the government decision-makers has been getting complex and difficult as asserted in a report by Manpower that "the question is no longer restricted to whether migration should or should not be allowed, but is shifting to the question of how to manage migration effectively to enhance its positive effects on development while mitigating any negative impact" (Manpower, 2008). Developing countries are in a rapid development process and there is large gap of all kinds of talents. However, developing countries are also more vulnerable to brain drain. With reflection on previous scholarship and the cases of China and India in particular, the following are potential ways in which developing countries could adapt in modern societies when the competition for

talents is unprecedentedly fierce.

First, improve domestic education system. India faces serious skill shortages due to the incompetent graduates for the demanding jobs. Skill shortages are particularly serious in professional fields such as information technology (IT) and business-process-outsourcing (BPO) industries. According to a 2005 report by NASSCOM, an Indian software and services company, the share of technical graduates competent for IT jobs were just 25% and those suitable for BPO related jobs were only 10% to 15%. The gaps of qualified employees were estimated to be 500,000. Companies are worried about the quality of university education given the fact that most PhDs are not awarded by institute with good reputation. (Khadria, 2010). Governments can through increase education investment, enhance education management to improve domestic education system.

Secondly, develop measures to attract talents to come back. To attract the talents back could be done through the following measures: implement incentive policies to attract talents back to work or set up their own businesses; provide economic support, e.g. start-up capital, to the returning talents; improve domestic entrepreneurship environment, e.g. construct high-tech industrial parks; improve linkage with the overseas talents, e.g. provide services to Diasporas, and establish organizations of overseas talents; and simplify the bureaucracy procedures, e.g. quick visa procedure.

Thirdly, establish a dual nationality or Green Card scheme. Developing countries' implementation dual nationality or implementation of Green Card scheme would help attracting many oversea talents coming back, and enhance their national identity and sense of belonging. (Zhang etc ,2012)

Fourth, make good use of talents with international experience. Considering the motivations of brain drain, Iravani (2011) assists that brain drain can be stopped by providing proper professional opportunities to talents so that they can realize their capability. If the talents can have opportunities utilizing their talents and knowledge, they would prefer to work at home. A

successful example is the contribution of the foreign educated engineering returnees in Taiwan's achievement in personal computer and integrated circuit manufacturing (Saxenian, 2005).

Fifth, enhance bilateral cooperation with governments of developed countries. The competition for talents is the trend in modern societies. An enhanced bilateral cooperation between sending countries and host countries could contribute to the optimization allocation of talents, ensure safe and smooth talents flow internationally, and finally realized a win-win situation (Manpower, 2008).

Sixth, establish other measures to compensate those left behind. Early in 1970s, researchers have proposed a tax policy to compensate the developing country which losses high quality talents through brain drain. It was suggested to be done by imposing an income tax on the emigrated professionals working in developed countries. Taxes may be collected by the government of the host countries and delivered to developing countries through the UN. This kind of remedy measure intends to offset the economic impacts of brain drain and to retain the talents who want to emigrate (Iravani, 2011). This measure not been accepted by developed countries, because this measure could reduce brain drain from developing countries to developed countries and hurt developed countries' benefit of talents competition. But along with the growth of developing countries' international influence, it is possible let developed countries accept this kind of remedy measure through interest exchange.

9. Conclusion

Increasing talent mobility is a trend in modern times. Brain drain of developing countries has been a topic of intense academic and political debate since 1960s, but now reverse brain drain is also a hot issue. Despite different surveys on the motivations of brain drain or reverse brain drain give rather different results, generally, the talent migration is motivated by economic factor, pursuit of career goals and higher quality of life.

Global economic recession influences the brain migration to some extent. Under the situation of global economic recession, developed countries have tightened immigration policies. The sluggish economic situation in developed countries may contribute to the reverse brain drain to developing countries. The economic recession in developing countries may drive some students to study abroad. This finding improves the academic theory of relationship between reverse brain drain and global economic recession

The most migrating groups of talents in China are the tertiary students and researchers while in Indian are the IT professionals, health care workers, and tertiary students. According to the data collected, brain drain of China is mainly associated with people who leave to study. However, in India, many get India's great training at the few elite schools (AIIMS, IIT), and then leave. This may indicate a worse type of brain drain than the Chinese case because Indian government loses more fiscal expenditure on the training of the talents who emigrated. This conjecture laid a foundation for further research on the influence of different kinds of talents emigration.

Although the data collected is not harmonized to allow an accurate comparison of the severity of brain drain in China and Indian, to some extent it can be concluded that India faces more serious brain drain than China. This is maybe due to several reasons: Indian education system is worse than Chinese which motivate many Indian students to study abroad; the better English proficiency of Indians makes them easier to migrate to other countries; higher

unemployment rate in India drives more talents to emigrate. This conclusion is also reflected in the 2011 and 2012 Manpower Group Talent Shortage Survey.

Through information collection and comparative analysis on status of brain drain in China and India, I got clearer understanding and new partition for impacts of brain drain: impacts on development of economy and technology, impact of fiscal expenditure loss, impact of invasion to education and research.

This thesis also separately analyzed the reasons of brain drain in India and China. Through analysis, the different reasons of brain drain in these two countries which have different political systems and social cultures have been exposed. The influence of different political systems and social cultures to brain could be studied further.

Through original comparative study of different policies of Chinese and Indian governments for coping with brain drain problem, I have gotten a better understanding on the implication of policies on brain drain and find out some proper policy measures for developing countries to cope with the negative effects of brain drain. Recommendations put forward for the governments of developing countries to cope with brain drain problem include improve domestic education system; implement measures to attract talents; carry out dual nationality or Green Card scheme; make good use of talents with international experience; enhance bilateral cooperation with governments of developed countries and so on.

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Appendices

Table 6. The number of India students in the US in different years (Date sourced from Open Doors Data)

Year	1999/2000	2000/2001	2001/2002	2002/2003
Number of Indian students in the US	42,337	54,664	66,836	74,603
Year	2003/2004	2004/2005	2005/2006	2006/2007
Number of Indian students in the US	79,736	80,466	76,503	83,833
Year	2007/2008	2008/2009	2009/2010	2010/2011
Number of Indian students in the US	94,563	103,260	104,897	103,895

Table 7. The number of Chinese students going abroad and returned (Cao, 2011)

Year	The number of Chinese students abroad	The number of returned students	Rate of return (%)
1978	860	248	28.84
1979	1777	231	18.16
1980	2124	162	13.46
1981	2922	1143	23.22
1982	2326	2116	38.96
1983	2633	2303	49.07
1984	3073	2290	54.04
1985	4888	1424	48.13
1986	4676	1388	44.72
1987	4703	1605	43.06
1988	3786	3000	47.12
1989	3329	1753	47.61
1990	2950	1593	48.08

1991	2900	2069	49.65
1992	6540	3611	50.39
1993	10742	5128	49.92
1994	19071	4230	43.25
1995	20381	5750	40.17
1996	20905	6570	38.66
1997	22410	7130	37.58
1998	17622	7379	38.05
1999	23749	7748	37.36
2000	38989	9121	34.92
2001	83973	12243	29.36
2002	125179	17945	25.01
2003	117307	20152	23.34
2004	114682	24726	23.03
2005	118515	34987	24.02
2006	134000	42000	25.09

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